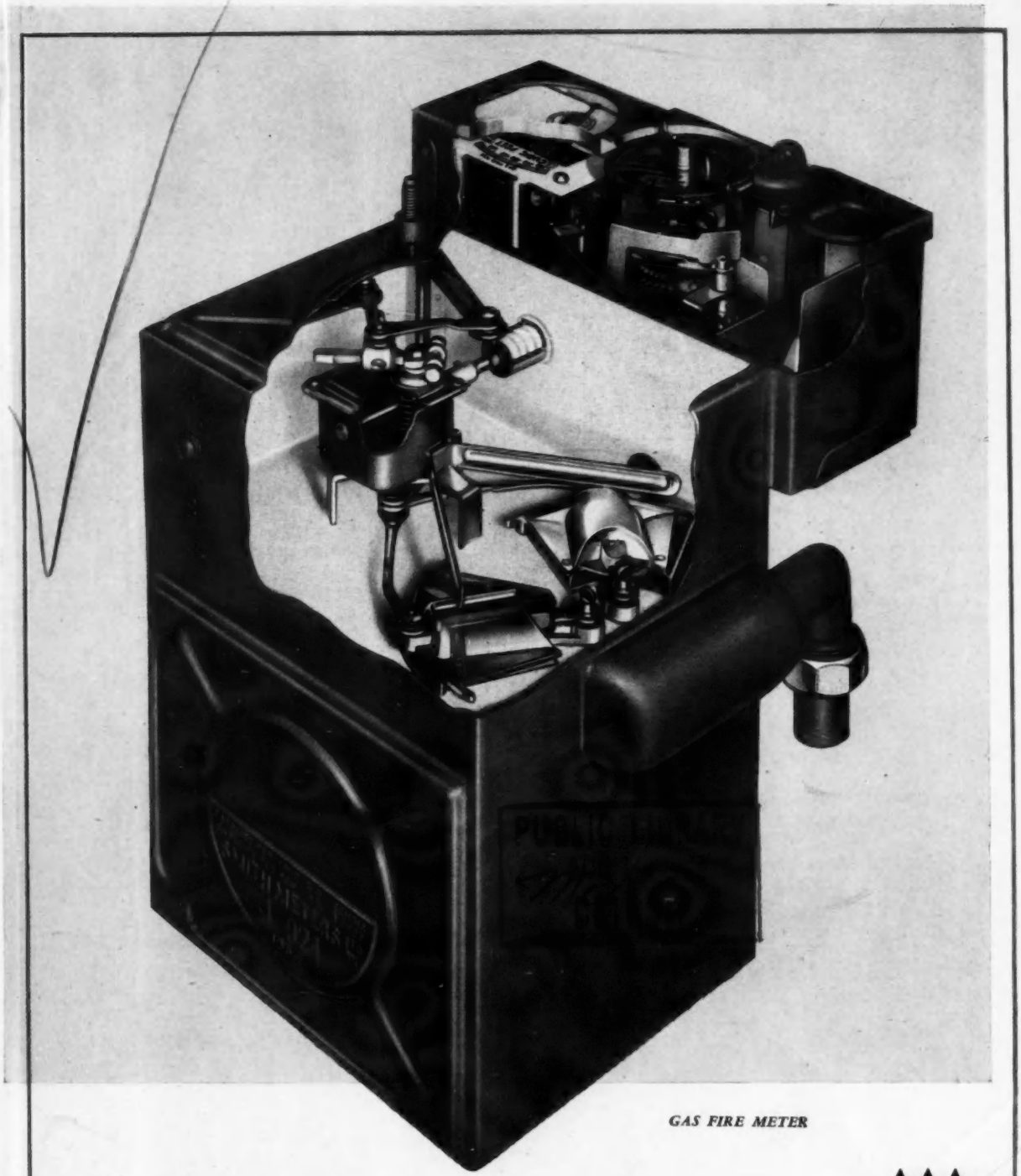
TECHNOLOGY DEPT.

Gas Journal

VOL. 287. 108th YEAR. LONDON, JULY 25, 1956. No 4854. PRICE 1/6



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U·G·I GROUP

Smith Meters Limited, 186 Kennington Park Road, London, S.E.11

Steel Bunkers and Chimneys at Power Stations and Works are usually lined with GUNITE which withstands abrasion and chemical attack without adding seriously to the weight.

GUNITE

puts longer life into Bunkers

The Gunite process, developed by the Cementation Co., Ltd., has a successful record of over 25 years as a facing for both new and dilapidated structures.

It is water, weather, and fireproof, and has great mechanical strength and hardness. Its adhesion to concrete is greater than the strength of the concrete itself.

Write for your copy of the Gunite booklet which illustrates and describes its characteristics and applications for factories, chimneys, wharves, water towers, reservoirs, sea walls, silos, etc.

The CEMENTATION COMPANY LIMITED

BENTLEY WORKS, DONCASTER

Tel. 54177-8-9

London office: 39, Victoria Street, S.W.1.

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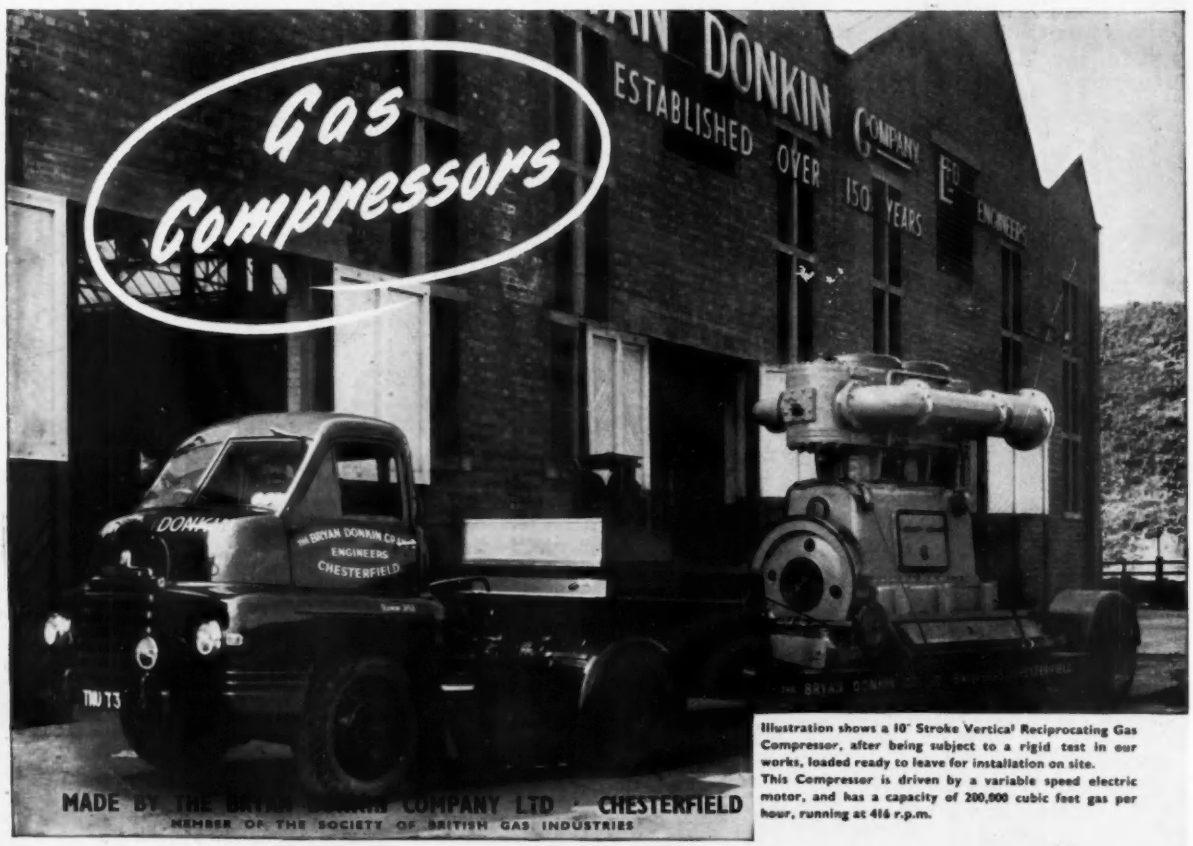

Illustration shows a 10" Stroke Vertical Reciprocating Gas Compressor, after being subject to a rigid test in our works, loaded ready to leave for installation on site. This Compressor is driven by a variable speed electric motor, and has a capacity of 200,000 cubic feet gas per hour, running at 416 r.p.m.

In the extensive Mainlaying programmes now being carried out, the experience and technical skill of the Norwest Construction Company will be found a considerable asset.

The number of large main-laying contracts now being handled by Norwest in different parts of this country is a fact which tells its own story of competitive tendering and 100% efficient work. Call in the "Norwest" for your next contract.

THE **MAIN** LAYING PEOPLE NORWEST

NORWEST CONSTRUCTION CO. LTD., LIVERPOOL, 21 • CIVIL ENGINEERING CONTRACTORS

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for HIGH PRESSURE, COLUMN GUIDED

GASHOLDERS

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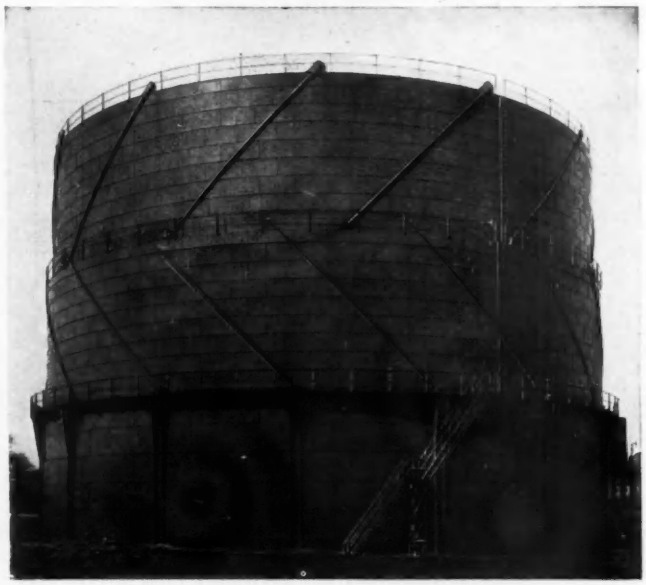

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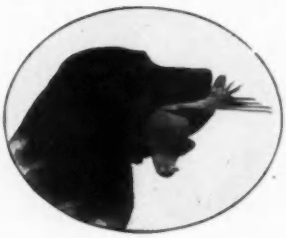
COKE RECOVERY FROM PAN ASH, AND COKE BREEZE WASHING

by the improved

"RETRIEVER"
(REGISTERED TRADE MARK)



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Sole makers

CLAPHAM BROS. LIMITED

MAKERS OF GAS WORKS EQUIPMENT SINCE 1837

KEIGHLEY-YORKS - Tel: 2787-2788 - Grams: "Clapham Bros., Keighley."

Here indeed is all they need!

58 GNS. (TAX PAID)

The famous Electrolux GAS REFRIGERATOR

. . . sized and priced for the majority of homes

Even with the door *closed*, the grace of the Electrolux L.230 is an 'open invitation' to buy! But when the cabinet is opened, showing its easy-to-clean porcelain enamelled interior, its adjustable shelves, its neat ice-making compartment — and the door to store more, then this lovely refrigerator is irresistible. In a choice of either WHITE or CREAM finish . . . without moving parts to wear . . . it's a fine investment for the future—and a *best seller*.

- **Shelf area 5 sq. ft. Adjustable shelves.**
- **A door to store more.**
- **Permanently silent operation by gas.**
- **Cooling unit guaranteed 5 years.**
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THE FLAME THAT FREEZES

ELECTROLUX LIMITED, 153/5 REGENT STREET, LONDON, W.1

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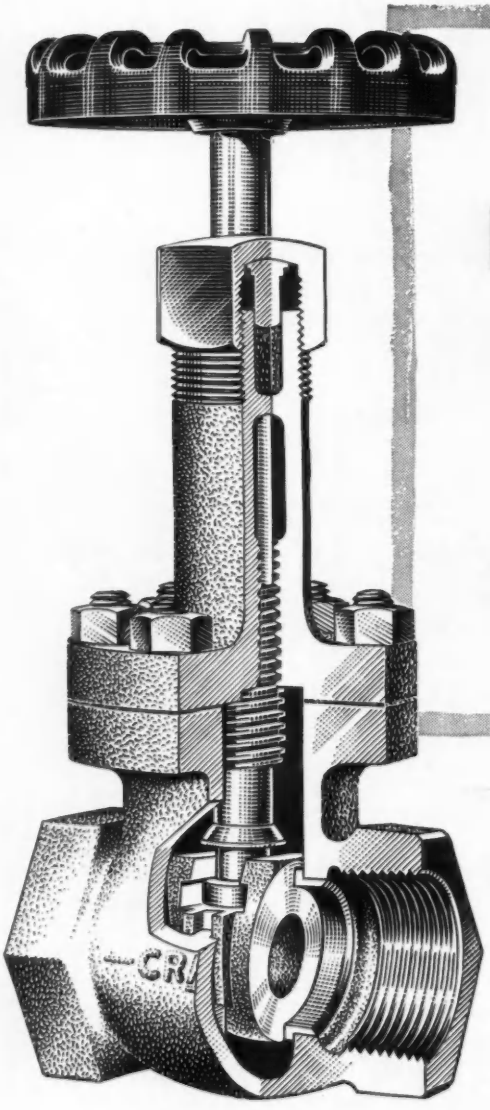

CRANE NICKEL ALLOY WEDGE DISC BRONZE GATE VALVES

with stainless steel seats

D186 Sizes: ¼" to 2"

Hexagon ends with British Standard taper threads or to American Standards where specified. Non-heat handwheel; Rising Stem.

Crane Bronze Check Valves D145 are recommended for use with these valves.

This recent addition to the Crane range is one of a new series of high pressure Bronze Valves—designed to take steam pressures up to 300 pounds (temperatures up to 550°F.) as well as water, oil or gas, cold, non-shock services up to 1000 pounds. To ensure an exceptionally rugged durable valve, materials for all parts were carefully chosen. The body and bonnet are cast from high grade bronze, whilst the Nickel Alloy solid wedge disc and, Stainless Steel seats are especially resistant to wear, being very hard and tough. Sizes 1 inch and smaller are supplied with a Union Bonnet; larger sizes have a compact inside screw bolted bonnet. Back-seating allows the valves to be repacked whilst fully open under pressure.

Another version of this valve, D185, having bronze integral seats but otherwise identical in all respects, is also available. Individual factory testing of these valves, as of all Crane products, ensures their complete dependability in service and low maintenance for the future.

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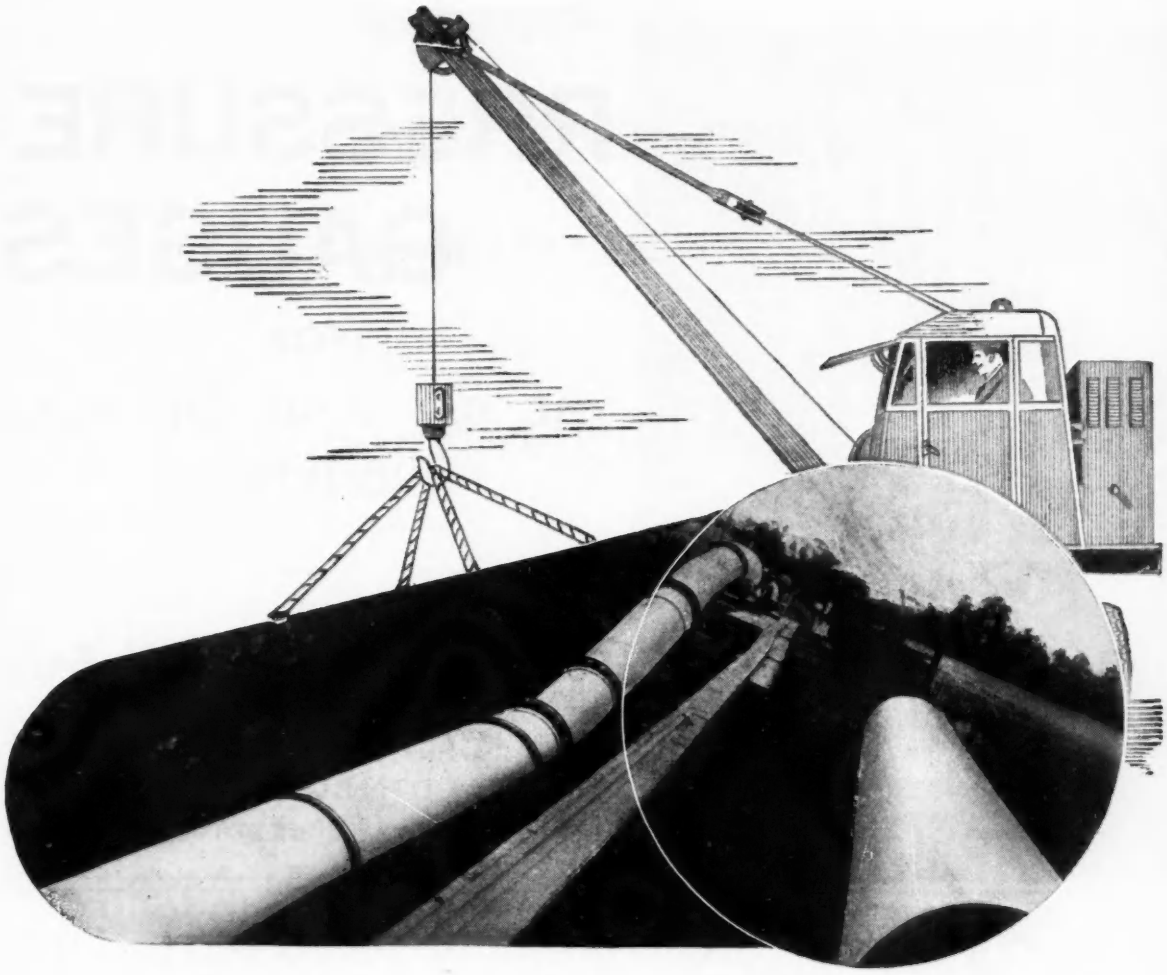
V8

CRANE LTD., 15-16 RED LION COURT, FLEET ST., LONDON, E.C.4. Works: IPSWICH. *Branches: Birmingham, Brentford, Bristol, Glasgow, London, Manchester*



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The strength and comparative lightness of the large diameter steel pipe coupled with its sectional length of twenty-five feet means faster laying, fewer joints and no breakage risks—practical and economical progress. Other equally important features of these pipes are illustrated in our Catalogue S.P. 40.

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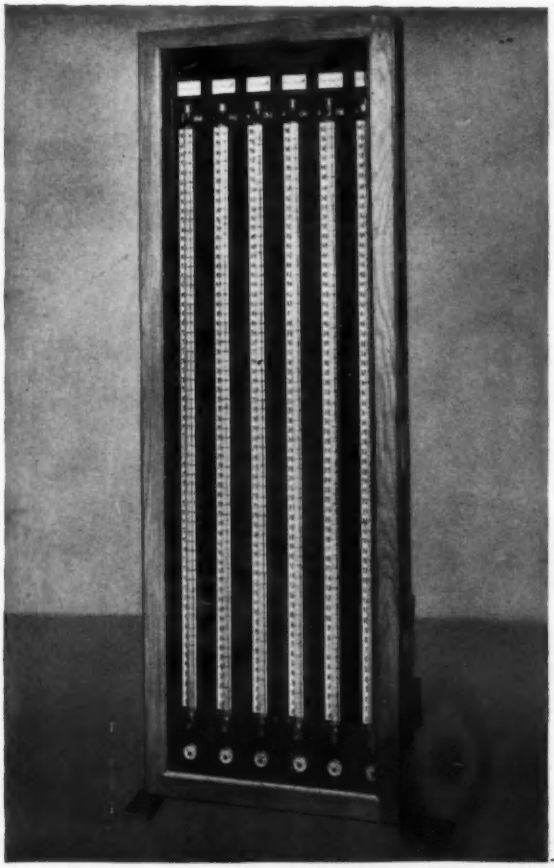

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FOR

THE GAS AND CHEMICAL INDUSTRIES

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J.H.C ALUMINIUM SERVICE GOVERNORS

JEAVONS

★ Incorporating the latest improvements in Governor Technique.
★ Designed for moderate gas loads—for larger capacities specify J.46.
★ Compensated against inlet pressure fluctuations.
★ Immediate delivery.

Details and samples on application.

Supplies available in Australia from MACKAY SIM (Pty) LTD., P.O. Box 16, 786-788, Pacific Highway, Gordon, N.S.W.

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W.W-D. ELECTRO-DETARRERS

For the New Gas Making Processes

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SITE	NO. OF UNITS	TYPE OF GAS	CAPACITY M.C.F.D.
*1 Kensal Green N.T.G.B.	1	Hot G.I. (Comp. Gasification) ...	12
*1 Kensal Green N.T.G.B.	1	Cold G.I. „ ...	6
2 Sydney, Australia	2	High B.T.U. Oil Gas	13
* Stratford N.T.G.B.	1	C.W.G. (Heavy oil)	15½
2 Watford E.G.B.	1	Complete Gasification	4½
* Surabaya (Indonesia)	1	ONIA-GEGI	4
*3 Warrington N.W.G.B.	1	C.W.G. (Heavy oil)	11
Ponders End E.G.B.	1	Segas	8
*3 Portsmouth S.G.B.	1	ONIA-GEGI	11½
2 Uxbridge N.T.G.B.	1	Segas	4
*4 Gloucester S.W.G.B.	2	Hot G.I. (Comp. Gasification) ...	15½
*4 Gloucester S.W.G.B.	1	Cold G.I. „ ...	10

NOTES

*Detarrers handling cyclic gas before the relief holders.
1 Plant ordered by Woodall Duckham Co. Ltd.
2 „ „ „ Ashmore Benson Pease & Co.
3 „ „ „ Humphreys and Glasgow Ltd.
4 „ „ „ International Furnace Equipment Ltd.

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MANOX OXIDE
FOR THE GAS INDUSTRY
The material offered is our own manufacture, and is of the following composition:—
Moisture ... ... 38% (loss on heating at 212 F)
Ferric Hydrate 63%-65% (Total iron calculated as $Fe_2O_3.3H_2O$ on the dry basis)
The following allowances will be made in the case of any deviation from the above specification:—
For each complete 1% Moisture in excess of 38% 6d. per ton allowance.
For each complete 1% Ferric Hydrate less than 63% 6d. per ton allowance.
SPEEDIER DELIVERY
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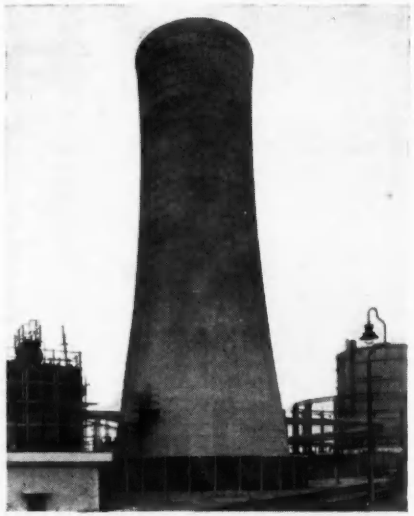
Grams. "OXIDE" MANCHESTER

North Western Gas Board



North Thames Gas Board

North Eastern Gas Board

Recent

CONTRACTS FOR THE GAS INDUSTRY

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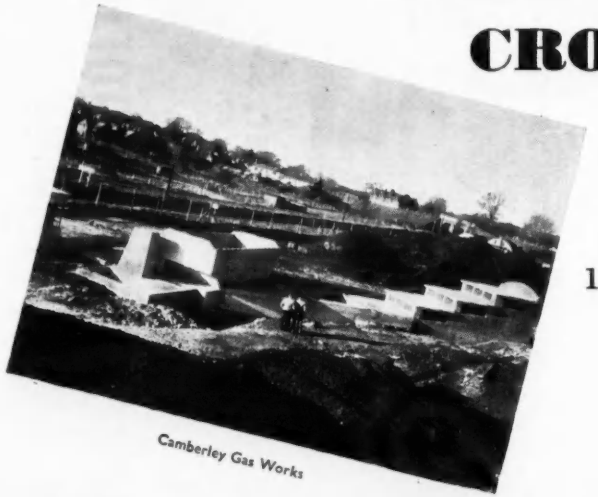
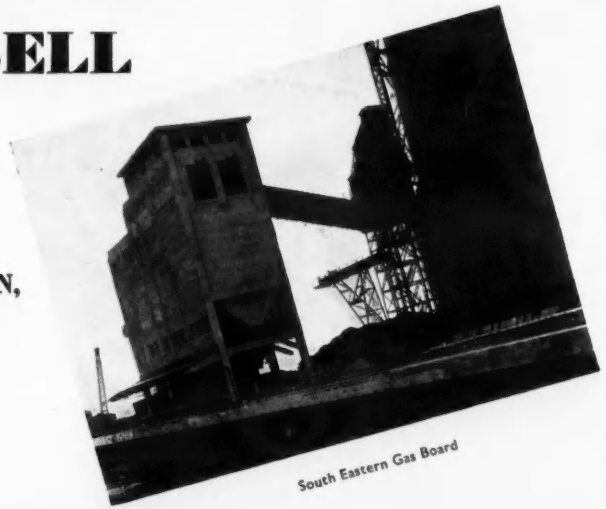
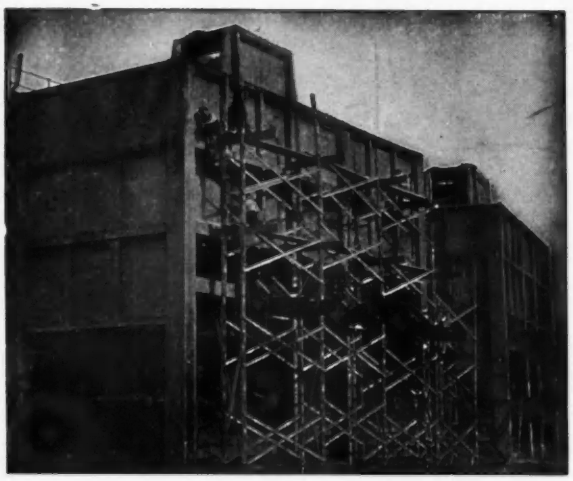


Camberley Gas Works



South Eastern Gas Board

Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

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THE CONCRETE PROOFING CO., LTD.

Handbook "GUNITE" sent on request

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One might say that we have been practising exact duplication all our lives, though in maturer years our medium changed. This spadework has resulted in an unrivalled service in the duplication of elevator buckets of EVERY kind.

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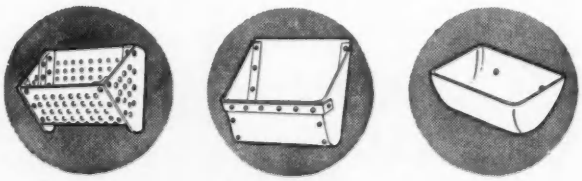
We guarantee perfect replicas of any type of elevator bucket



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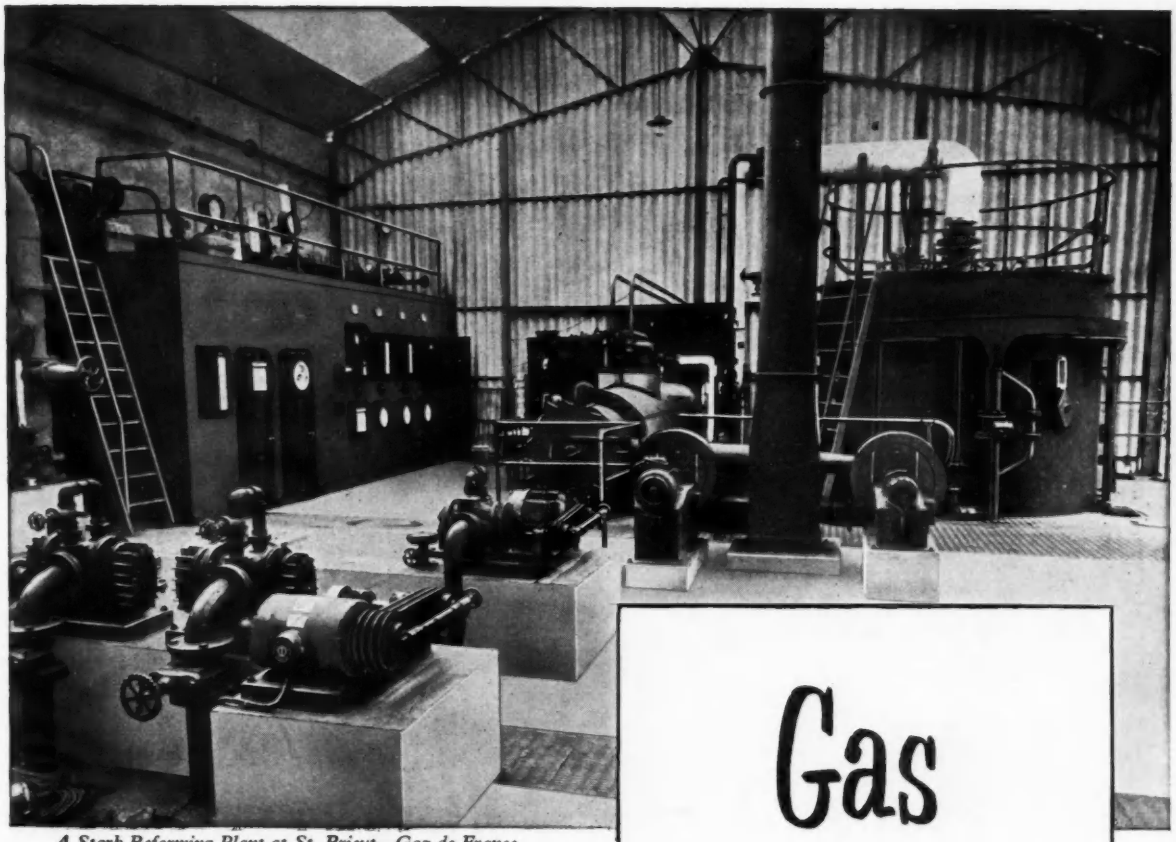

A Stark Reforming Plant at St. Brieut—Gaz de France

Gas Reforming

AUTOMATIC
CONTINUOUS
ECONOMIC
SIMPLE

The Stark Generator

is the most modern development in the catalytic process for the reforming of Hydrocarbon Gases such as Propane, Butane, Propylene and Petroleum Refinery Gases.

Starting with a feedstock gas of high calorific value and specific gravity it can continuously and automatically produce gas of any desired calorific value and specific gravity within the range normal to Town's Gas. The final gas produced can either be mixed with Carbonisation Gas or distributed directly without the necessity of burner adjustment.

This latest addition to the Balfour range of processes and equipment is simple to operate, efficient and economic, and ideally suitable where an appropriate feedstock is available for the production of Town's Gas.

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Two of the several routine inspection tests to which all Cornwall Brand Lead is subjected. The Top illustration is of the Turnpin test.

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The concentricity and wall thickness are being inspected and checked in the lower photograph, by a member of our Inspection Staff. These tests provide just two of the many reasons why We Lead in Lead.

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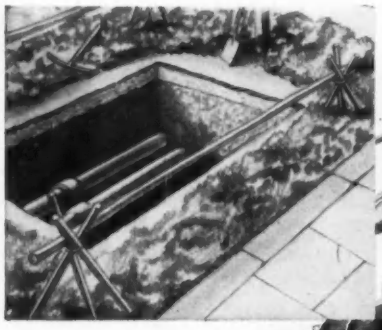

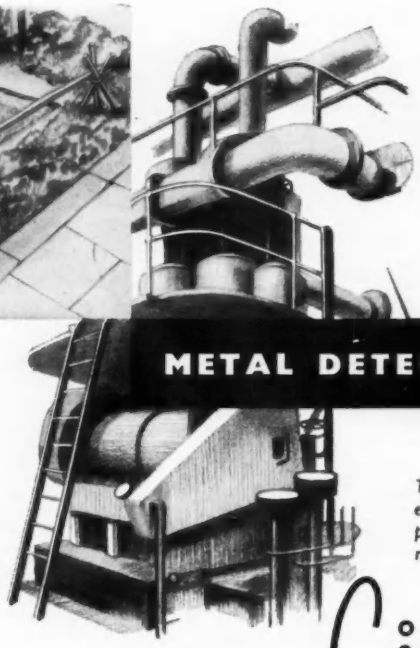

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The 'Cintel' Portable Metal Detector is the quickest and most economical method of locating hidden manhole covers, buried pipes, etc. If you are one of the few not yet using this instrument, may we send you details?

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CINEMA-TELEVISION Ltd.

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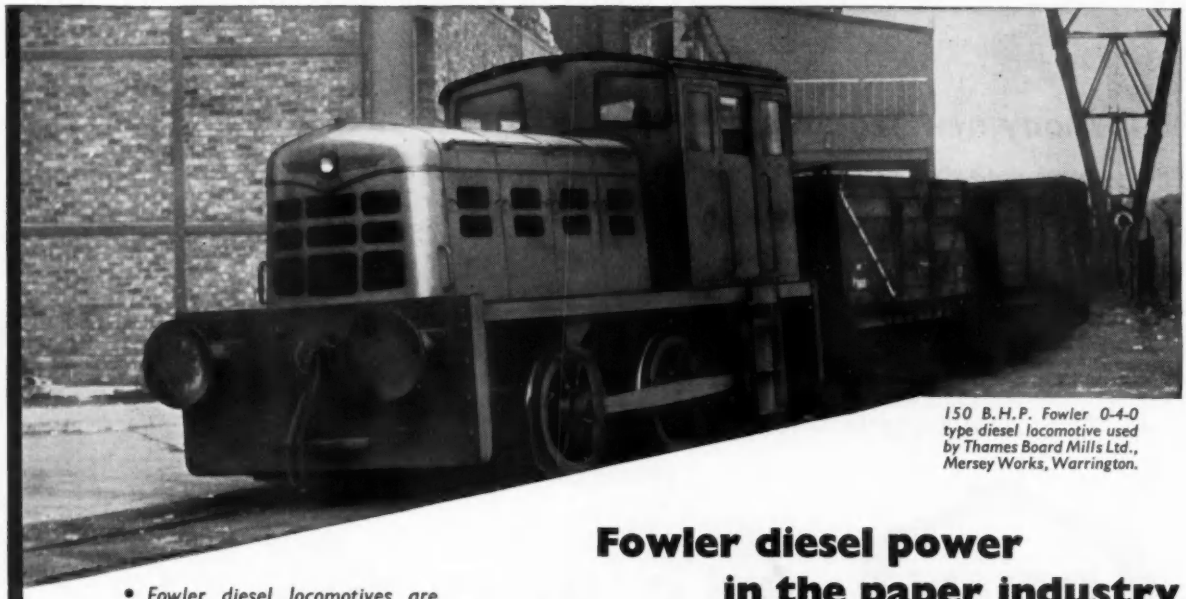

150 B.H.P. Fowler 0-4-0 type diesel locomotive used by Thames Board Mills Ltd., Mersey Works, Warrington.

- *Fowler diesel locomotives are ideal for all industrial purposes, general or specialised.*
- *Low fuel consumption and high performance for economy.*
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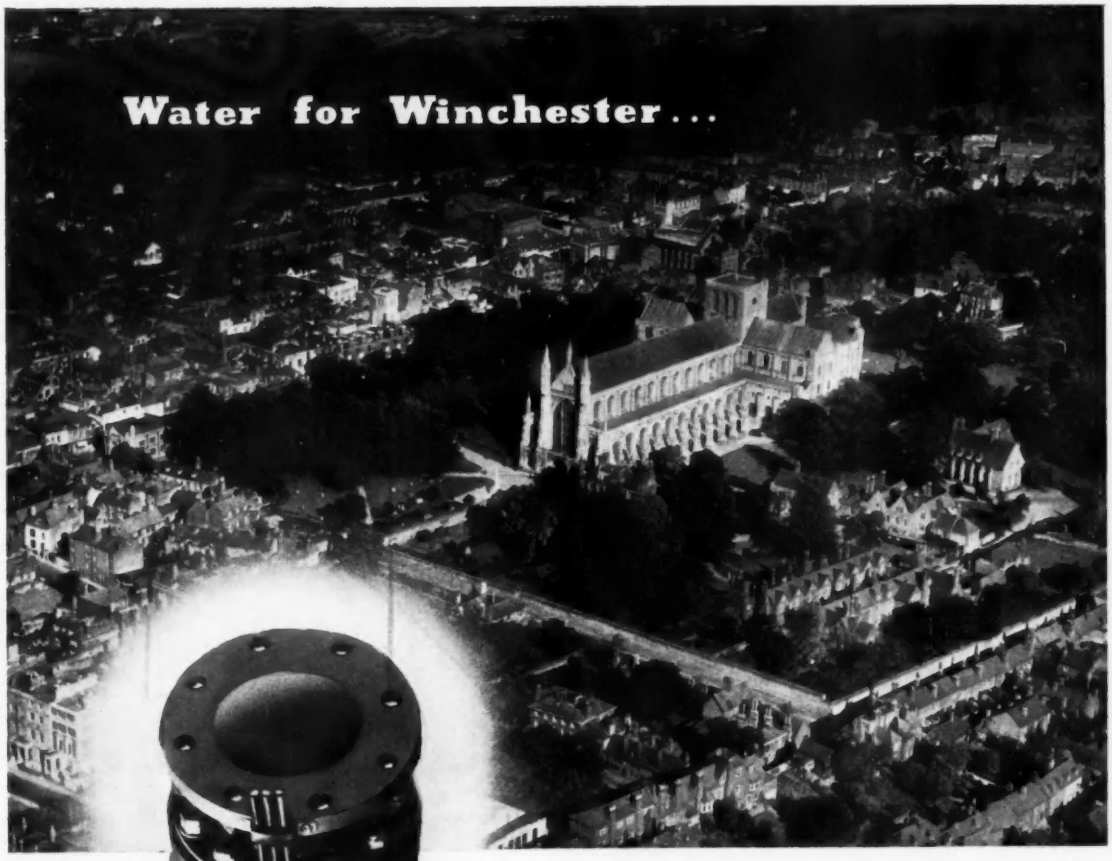
Products of the Marshall Organisation, Gainsborough, England.



We are indebted to William C. Johnson, Esq., A.M.I.C.E., A.M.I.Mech.E., M.I.W.E., City Water Engineer and Manager of the City of Winchester Water Undertaking for permission to publish this advertisement.

ONE after another Water Supply Undertakings of the towns and cities of Britain are changing to the Electromersible way.

To the engineer this means a continuous flow of water at a pressure which can be applied direct to the mains, and at a very low cost per million gallons. It means that daily maintenance is eliminated and that each unit can be raised to the surface without disturbing any moving parts.

The installation at Winchester comprises three Electromersible pumping units capable of a total output of over 3½ million gallons daily.

May we send you our leaflet, "The Electromersible Way"?

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For over 100 years we have been serving the Gas Industry and the illustrations show equipment installed for the North Eastern Gas Board at Birkshall Works, Bradford.

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- Condensing Plant
- Tar Extractors
- Washers (Pumpless Patent)
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- Mechanical Handling Plant
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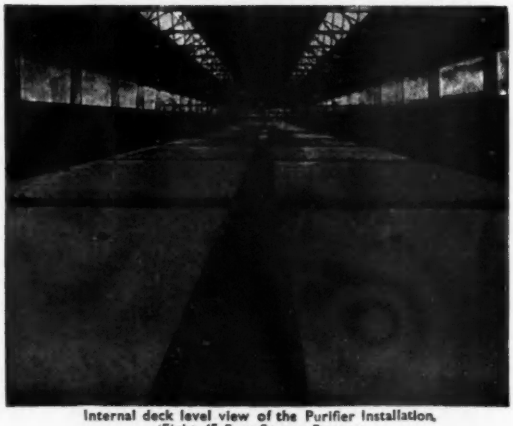
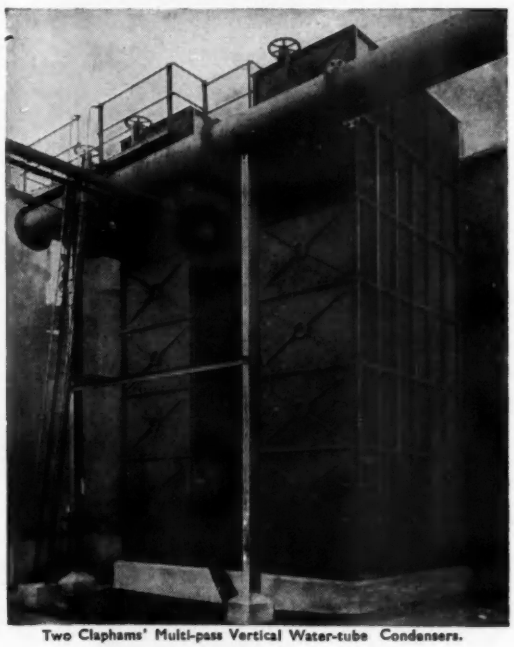
- Special Pipes and Connections in cast iron and steel

Two Clapham-Barwick Pumpless Static Ammonia Washers



Internal deck level view of the Purifier Installation. (Eight 45 Feet Square Boxes.)



Two Claphams' Multi-pass Vertical Water-tube Condensers.

CLAPHAM BROS. LIMITED
MAKERS OF GAS WORKS EQUIPMENT SINCE 1837
KEIGHLEY · YORKS Tel: 2787-2788-Grams: 'Clapham Bros. Keighley'

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Better fit Dresser — they're best all round!

Installing a Style 60 every time a joint is uncovered for any reason prevents future leakage and excavation expense. The fitment of Style 60 is a sure means of limiting "unaccounted for" gas to the minimum, and many undertakings find they are essential when mains are subjected to increased pressures. Installation is quick and easy, without interruption of service and no complicated tools or equipment needed. Unique design and balanced weight ensures adjustability and a perfect fit to joints of varying diameters. Sizes from 2½" to 48" for all types of socket and spigot joints direct from works to customers and obtainable only from DRESSER MANUFACTURES (ENGLAND) LTD. For long term service and economy fit

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STYLE 60

adjustable leak clamps

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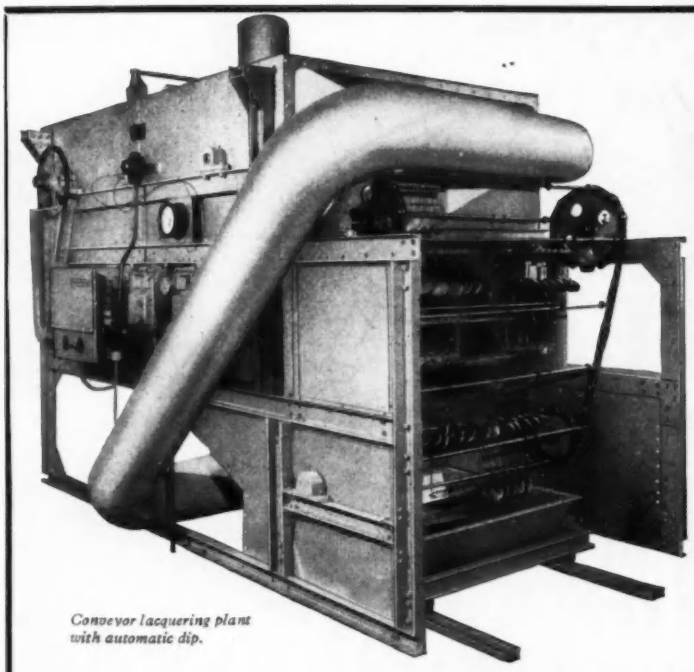

Conveyor lacquering plant with automatic dip.

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ENAMELLING OVENS
AND
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ALSO MANUFACTURERS OF STEEL PLATE GAS MAINS AND FABRICATED STEEL STRUCTURES FOR THE GAS INDUSTRY

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for industrial power

HIGH PRESSURE
BACK PRESSURE
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4,000 Kw Pass-out Set in a paper mill.

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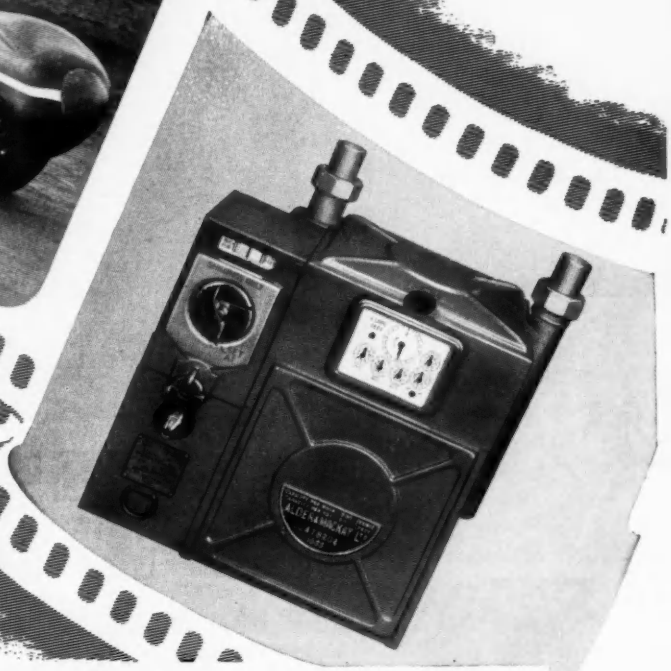
AND COMPANY LTD BOLTON

Photo by courtesy of "The Motor".

THE JAGUARS OF THE ECURIE ECOSSE RACING STABLE, owned and managed by David Murray of Edinburgh, by their many international successes aptly express an outstanding feature of A. & M. Meters . . .

'In the picture' with A. & M.



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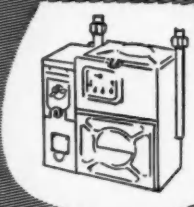

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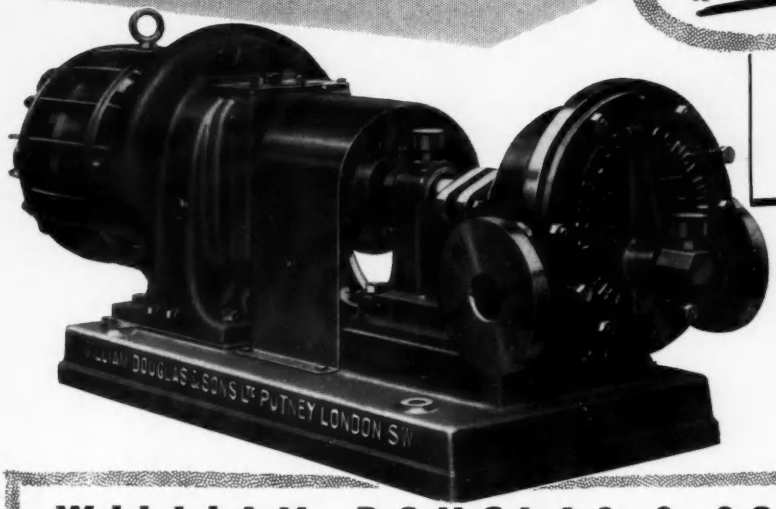

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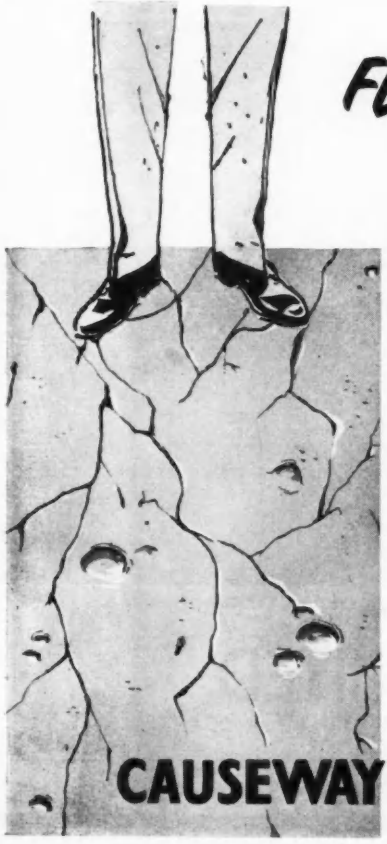

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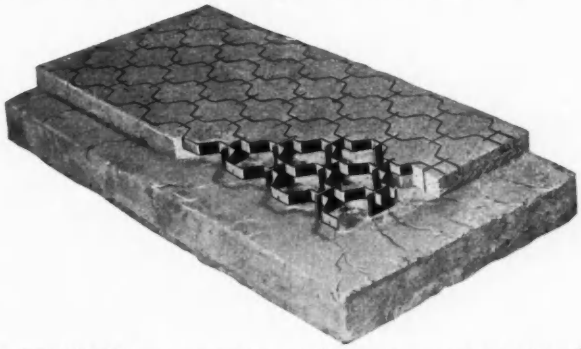

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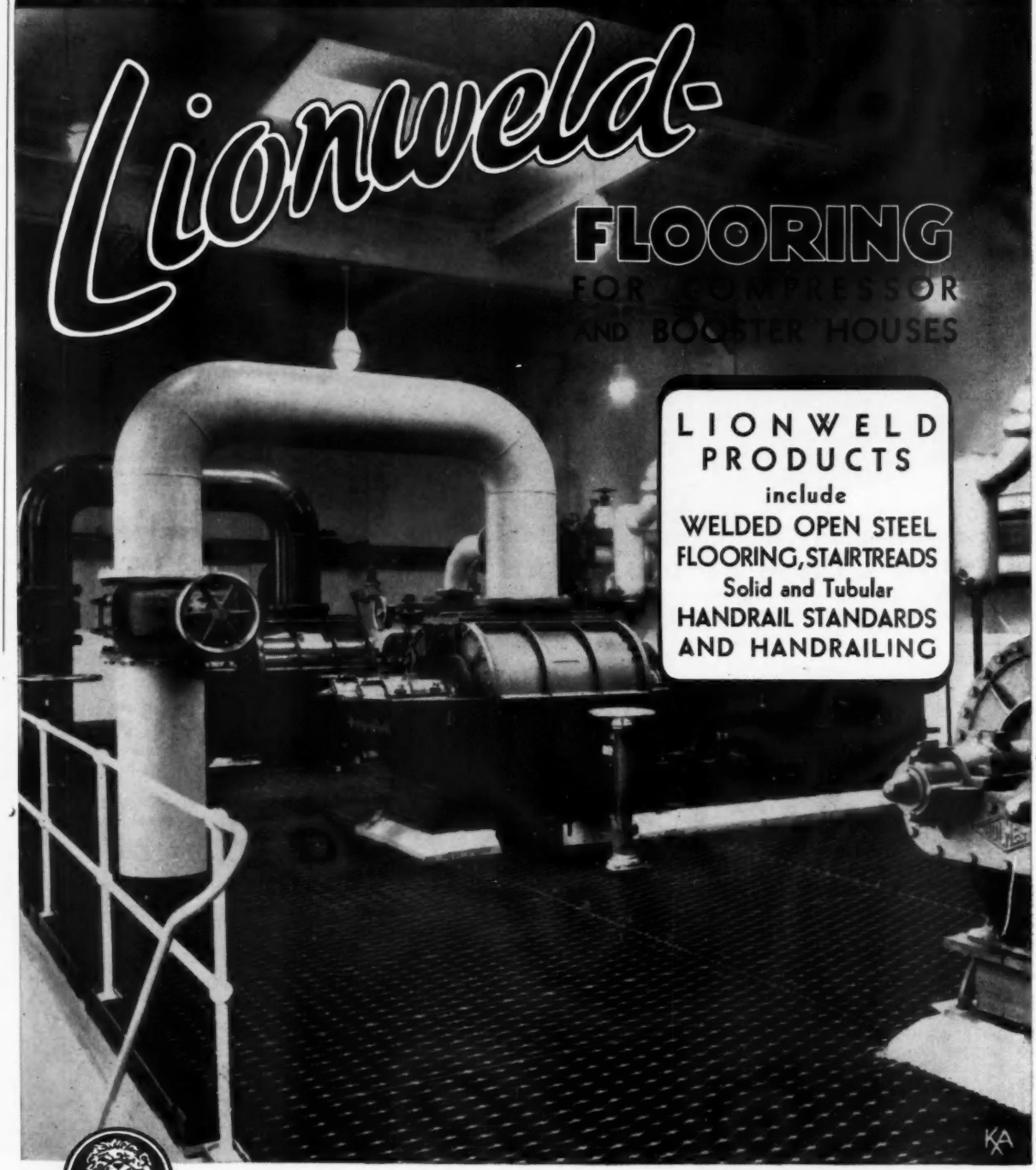

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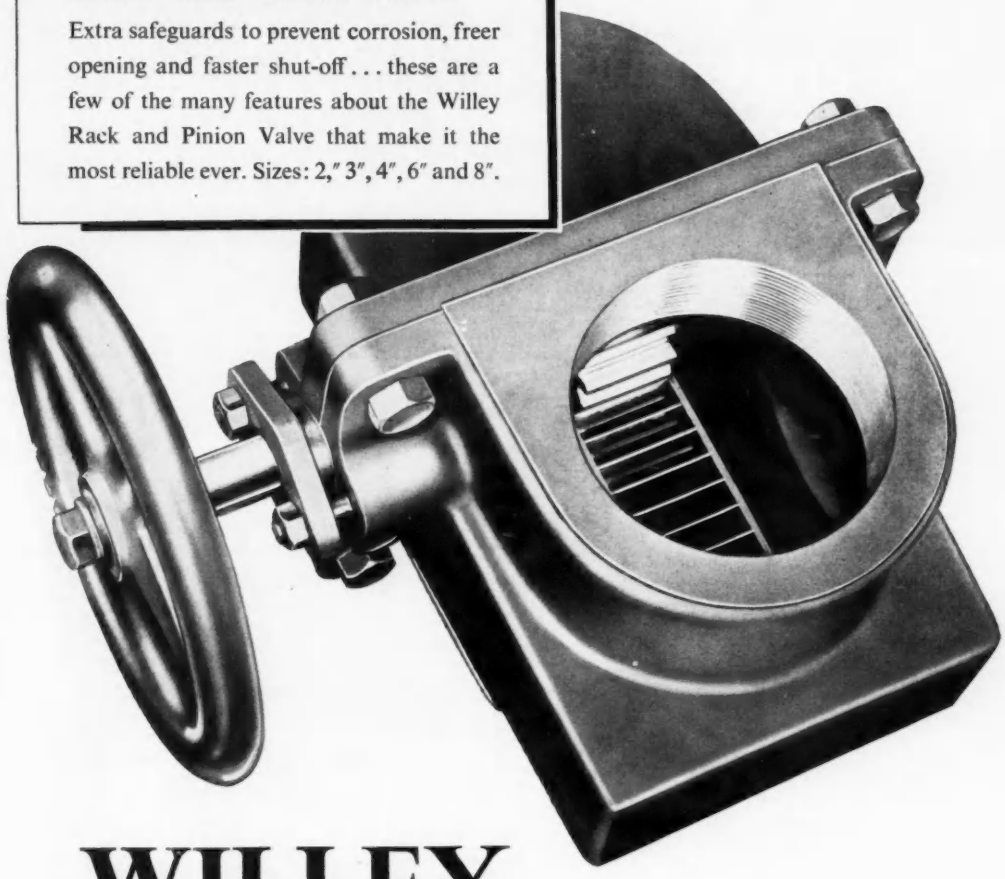

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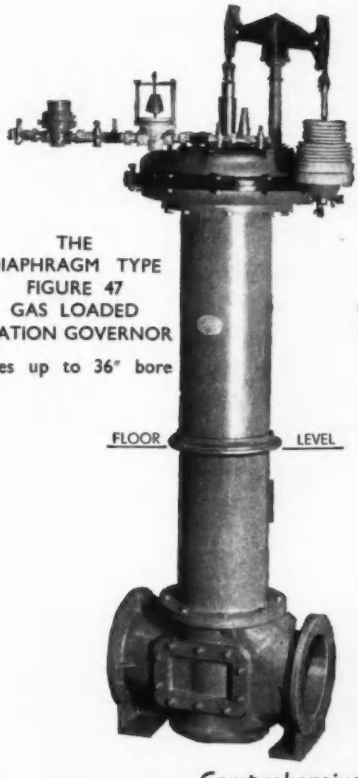
SINGLE-BEAT VALVE GOVERNOR FIGURE 98 (BALANCED) PATTERN



THE DIAPHRAGM TYPE FIGURE 47 GAS LOADED STATION GOVERNOR

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THE WEIGHT-LOADED FIGURE 109 DOUBLE-BEAT VALVE GOVERNOR

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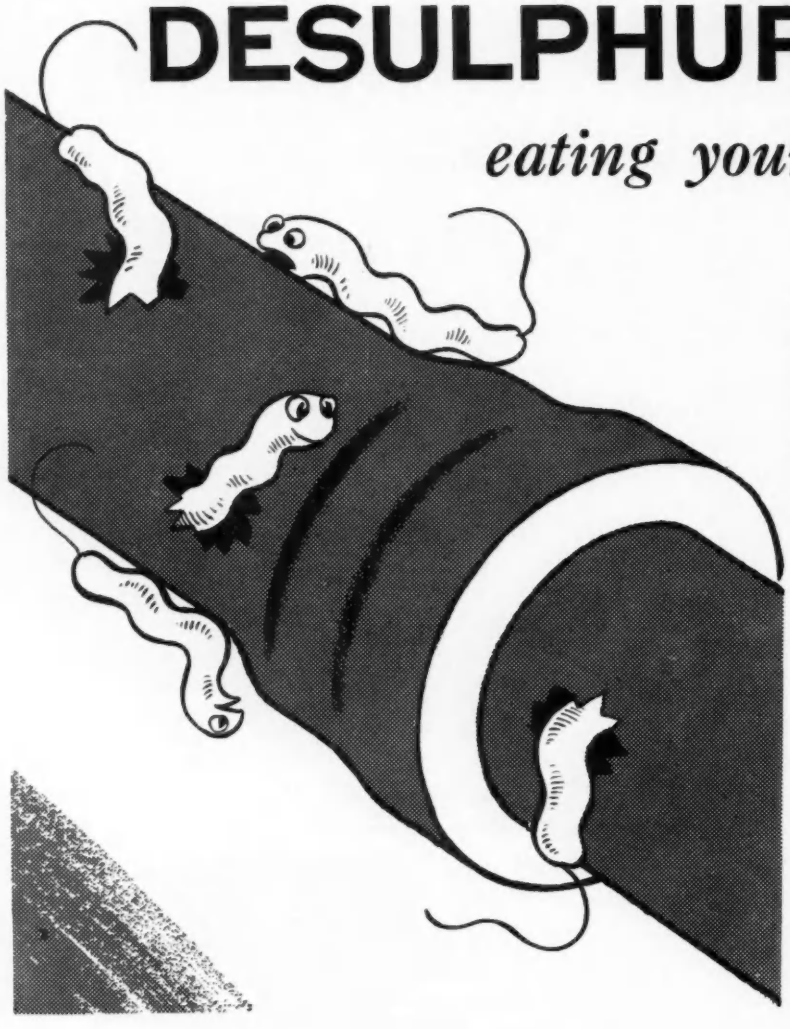

Well, we know they don't literally eat steelwork, but it's a recognised fact that these horrible little bacteria are responsible for the majority of underground corrosion.

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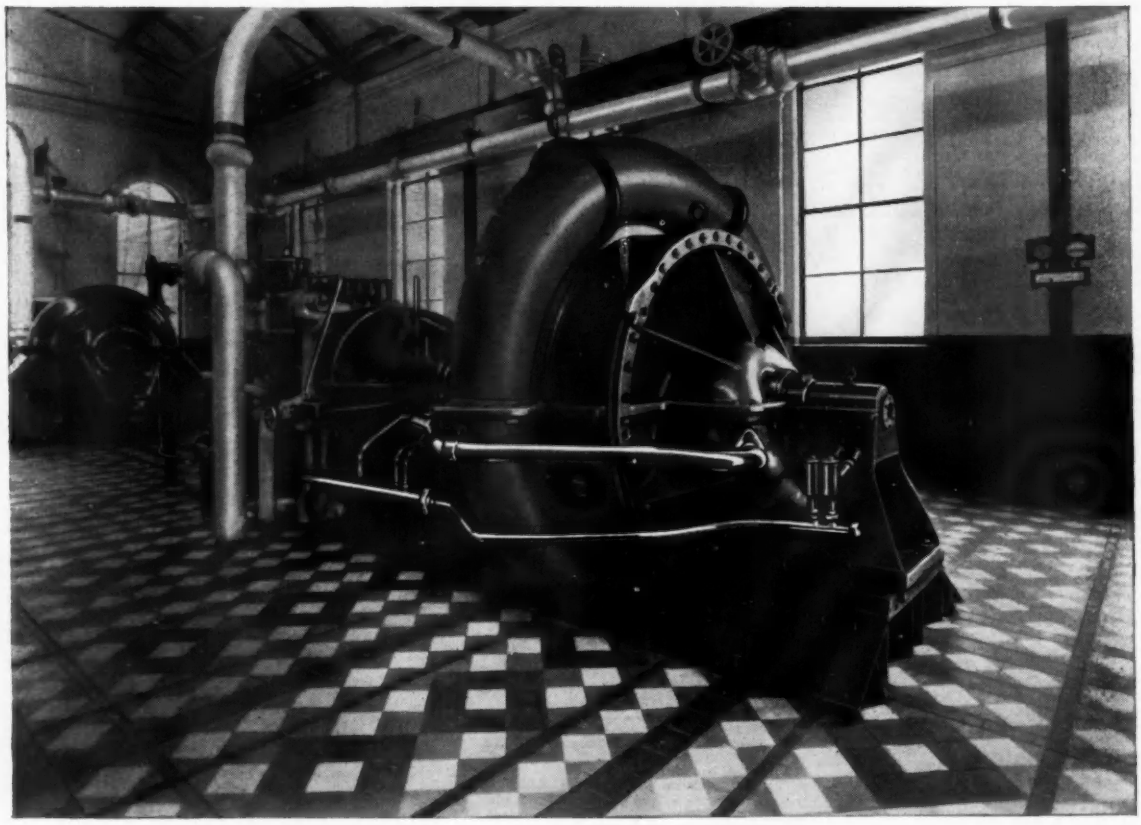

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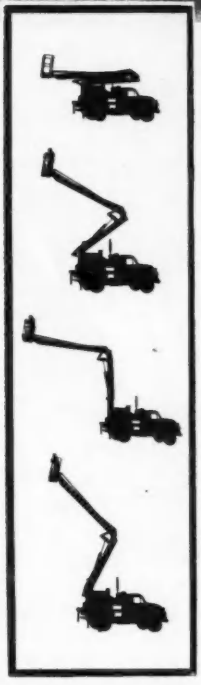

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Gas Journal

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108TH YEAR

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Gas Journal

VOLUME 287. No. 4854. JULY 25, 1956. 108th YEAR

First of the Super Works

IN this week's issue we publish an account of the new gasworks which is nearing completion at Denton in the North Cheshire Group of the North Western Gas Board. It is hoped that half production will begin here in September of this year, and that the works will be in full production by the end of the coming winter. This works represents a new conception in modern gasworks in the North West of England, and it will be the first of a quintet of super gasworks which are to be built or which are in progress of building. Among the other works to come into this category are the Garston works in the Liverpool Group and the Lostock Hall works in the West Lancashire Group.

The Denton works was first conceived by the old North Cheshire and District Gas Company, a wholly owned subsidiary of the United Kingdom Gas Corporation, and preliminary work was begun as long ago as 1947. On nationalisation the project passed to the North Western Gas Board, who realised what a potential advantage a new gasworks on this site would be to their future planning, for although it is geographically situated in the administrative boundaries of the North Cheshire Group, its output will be in far greater demand in the neighbouring Manchester Group.

By the completion of this new works one more step forward has been taken by the Area Board in furthering its policy of the supply of the cheapest possible gas, at the right pressure, at the place where the demand is greatest.

The Board envisages a completely integrated system of gas distribution in the industrial belt in Southern Lancashire and North Cheshire. This would mean that gas made in this area can be transmitted and consumed anywhere between Crewe in the south to Barnoldswick in the north and between Hoylake in the west and Glossop in the east. A great deal of the necessary main laying for the distribution link-up has been completed, but the chief task of the future must be the manufacture of the gas to fill the network.

At Vesting day the condition of the assets taken over by the Area Board differed widely in their condition and state of maintenance, but the average unfortunately was deplorably low. In order to make full use of the manufacturing capacity available, and to make certain that the gas pressure at consumers' meters was not only good but remained so even under the most difficult conditions, it was necessary for the Board to put in hand its plans for integration as quickly as possible. This would mean that the larger stations would have their manufacturing load factor raised, while the impossibly small and badly maintained stations could be shut down forthwith.

In some of the districts of small undertakings where the pressure had been unsatisfactory for years, the consumption after integration increased by more than 100%. Integration has also made the increased industrial consumption a possibility and at the same time has saved a large sum in providing increased storage.

The North Western Gas Board has several grids in course of development, as well as the one in the industrial belts. These include subsidiary grids in the West Lancashire Group, centred on Blackpool and Preston, and also in the sparsely populated Northern Group, centred at Barrow and Windermere.

Integration is only a stage in a long term policy, and it is right that it should have top priority as it will show results more quickly, and the cost of carrying it out, comparatively speaking, is not excessive. Sooner or later the manufacture of gas must be considered. The optimum size of manufacturing units must be decided on, the geographical position and the mechanics of the process worked out. The optimum size can be worked out by the consideration of first principles reinforced by years of experience, the geographical position must be related to areas of greatest demand, and the proximity of suitable sources of coal in order to cut down rail freight charges as much as possible; but the mechanics of manufacture and the application of the most up to date practice are perhaps what gas engineers will find the most interesting in our description of the Denton works, for nothing has been spared in thought and ingenuity to design a gasworks with as many advantages and as few weaknesses as possible.

It will be pure heresy to some gas engineers to learn that Denton works is an all electric works. There are no steam prime movers at all other than the three steam turbines which take steam from the waste heat boilers in

the retort house and generate electric power for the rest of the works, and even have power to spare to export to the electricity board's grid, which is glad to take it between the hours of 8 a.m. and 5 p.m. The layout of the mechanical handling of raw materials and products is in accordance with the latest practice, and a solution really seems to have been found for the twin problems of the stocking and the recovering from stock of coal and coke. Normally in any other than the most mechanically equipped works this is a most expensive and unsatisfactory procedure, but to all outward appearances the difficulties have been surmounted and after the usual teething troubles it will be confirmed in practice.

The design of the buildings is of a high order, and their outward appearance is both pleasing and functional. No unnecessary decoration and no appearance of mere adequate shelter for the plant and nothing more are to be seen. The retort house is outstanding in this respect as it is a large building, approximately 240 ft. by 200 ft., steel framed and brick panelled. No longer have we here the industrial 'cathedral' of immediate post-war days, which consumed millions of bricks when they were hard to come by, but a building of a pleasant façade almost Georgian in its simplicity, or may we dare to say neo-Elizabethan.

Here then is a new works, combining the latest in gas engineering practice, architectural design and carbonization ideas to produce as far as possible gas and coke at the lowest possible cost to supply the integrated gas grid and to ensure means of dispersing the accursed smog.

Watchdogs with Teeth

IT must by this time be generally realised that we are not whole-hearted admirers of the gas consultative councils. On too many occasions, it seems to us, the councils fail to fight for the interests of the consumer —and of what use is a toothless watchdog? All too often the chairmen, who occupy the ridiculous position of having one leg in the board's camp and one in the consumers', appear to place their weight on the former, acting as a diplomatic buffer against protests or complaints raised by the more energetic members of the council. Explanations put forward by the boards are seldom questioned. On the contrary, they are gravely accepted and, in due course, the council, with tears in its eyes, informs the consumer that nothing can be done. A vigorous consultative council must at times be a thorn in the flesh of the gas board, the more so as councils often bear out the truth of the old saying that 'a little knowledge is a dangerous thing.'

One Consultative Council which certainly does not lack a militant spirit is the East Midlands and, during a recent interview with its Chairman, Mr. A. Haslam Wood, we learned of the way in which the Council received the Board's proposals for an increase in the price of gas. During the past two weeks the Council and the Tariff Committee of the Council have had a number of meetings and conferences with representatives of the Board to consider these proposals which were based upon the suggestion that there should be an overall increase of approximately 8¼%, at which figure the prices would be held for a year.

Having regard to the current economic situation and the action taken by the Government to achieve steadiness in prices in order to reduce inflation, the Council expressed their concern at the amount of the proposed increase and in particular at the effect of this increase on the first 0-10 therms per quarter block, having regard to the considerable increase in the price of this block towards the end of last year. In the circumstances, they recommended that there should be no increase in the price of this block.

The Council also requested the Board to reconsider its proposal to increase prices by an overall increase of 8¼% and suggested that all forms of expenditure should be reviewed and the amount of the increase reduced by absorbing a greater proportion of the increased costs.

Now that figure of 8¼% amounted to less than 1¼d. per therm and, as the Chairman of the Board, Mr. R. S. Johnson, pointed out, if the Board accepted the Council's recommendation it would involve the Board in a deficit and no undertaking could be given regarding the pegging of prices. The Board's annual turnover was £26 mill. and the working margin during the past few years had been only half of 1%. The Board's Reserve Fund after seven years operation was very small and for that reason they could not in any circumstances anticipate a deficit. Finally the Council accepted the 8¼% increase but—and this is what we are leading up to—it won its point concerning the first block of the tariff. The Board have accepted the Council's recommendation regarding the elimination of the supplementary charge of 1½d. per therm on the 10 therms consumed each quarter, which prepayment consumers were previously required to pay. This will cost the Board £180,000 in a full year and will have the immediate effect of cushioning the increase on the first block of 0-10 therms per quarter. Prepayment consumers taking less than 10 therms a quarter will only be required to pay an extra ½d. per week.

The Council's victory is a worthwhile one as far as the Board's consumers are concerned and we have the impression that the whole operation has been undertaken in a forceful and determined manner. We hope others will follow suit, not because we have any desire to see the gas boards plagued to death, but simply because we are very tired of those who merely pay lip service to true consumer representation and because a good consultative council should bring about better gas service.

Redundancy in the South West

A strongly-worded resolution which censures the South Western Gas Board for its handling of staff redundancy has been passed by the South Western area gas staffs committee of the National and Local Government Officers' Association which met at Exeter on July 14. Because of re-organization 220 staff have been given six months' notice and told to indicate whether they wish to apply for alternative jobs with the Board. The redundancy comprises 150 in the general consumer function and 70 in accountancy, apart from those involved by the continued reduction in the number of manufacturing stations. These have already been reduced from 108 to 48, and will be lowered to 36 by the end of the year, the ultimate objective being 15 stations.

The resolution complained that 'contrary to Government policy' proper notice of the Board's intention was not given to the unions concerned, and that evasive

and contradictory statements on redundancy made to the staff and the public had 'only added to the general confusion.' In a statement to the 'GAS JOURNAL,' Mr. C. H. Chester, C.B.E., Board Chairman, said: 'The resolution is not in accordance with the facts as discussed between the Board and the appropriate trade unions.' The resolution also said that uneasiness and distress, caused by the Board's handling of the redundancy position, was adversely affecting the efficiency of the industry and was against the public interest. It alleged also that the Board had refused to put into writing the terms and conditions of removal allowances, and that redundant employees who had received six months' notice to end their present employment had been given only 14 days to decide whether they would apply for alternative positions within the industry. This, it was stated, was not long enough to enable the employees to obtain expert opinion on their compensation rights.

Mr. G. W. Phillips, Gas Service Conditions Officer, N.A.L.G.O., said the first indication of the present events was on May 15, when the Board sent a letter to the area secretary of the Association, Mr. B. Bailey, indicating that there would be within a few months a redundancy problem involving about 220 people. Mr. Phillips told the 'JOURNAL': 'While we don't like some of the processes that the Board have adopted in the situation we have confidence in their goodwill—confidence which we hope will not have been misplaced.' Another indication from sources outside the actual meeting also seems to endorse a feeling that the resolution and the consequent publicity might have introduced an atmosphere of recrimination into the *sub judice* negotiations: Mr. F. C. Henfrey Smith, General Secretary of the British Gas Staff Association, said that the closest consultation had been carried out between the Board and his Association since the matter had arisen. 'As far as we are concerned we are satisfied that the Board is doing what is right and proper.'

The problem appears to centre on the rapidity with which reorganized consumers' service and accountancy systems, set up two years ago, have again been selected for reorganization, slicing the number of districts and consequently staff, by precisely half. Some of those involved had removed home two years ago and find themselves faced with exactly the same necessity. In addition to staff redundancy 18 posts held by senior class officers have now been declared redundant. Most of these officers belong to the Gas Officers' Guild which, with N.A.L.G.O., is negotiating equitable terms on the transfer of these officers to other posts or for adequate compensation in default. Only lower graded posts are available, but an officer's present emoluments will be maintained by a personal addition to the salary of the new posts. Until this salary reaches the actual remuneration, however, general salary increases will be forfeit in whole or in part, except during the short interim period for those with long service.

The displacement of a senior officer, particularly one of mature age or long service, is a serious matter, since apart from upheaval and expense he is not readily likely to find employment in other industries, which do not often recruit from the gas industry. Inter gas board co-operation is called for in placing these officers whose chances, however, are not increased by the decline in status involved by the present and the 1954 exercises of the Board. However inevitable integration may be its consequence upon human beings cannot be said to be conducive to the recruitment of the best people to the industry without which it cannot prosper.

More About Liquor

THERE are few better qualified to speak on the subject of gas liquor than Mr. G. le B. Diamond. Not only is he chairman of the Gasworks Effluents Committee, which is concerned with technical aspects of disposal, but he is also chairman of one of the (may we say all too few?) gas boards which have adopted a vigorous liquor spraying policy. It is therefore gratifying that much of what Mr. Diamond says in his letter, published on p. 218, endorses our own comments of July 11. Indeed, even his gentle chastisement for a direct, albeit innocent, misstatement confirms one of our other criticisms—namely, lack of co-ordinated information.

If the gas liquor display at the Royal Counties Show was *not* the first of its kind, then there must have been a first display somewhere previously; and it is, perhaps, a little discouraging to those responsible for trying to run an effective and informative Technical Press to feel that the sponsors of that first display, wherever it may have been, thought it of such little general interest as not even to warrant informing the industry's Press at the time. We certainly gained the impression that those who staged the display at Poole honestly believed that their's was the first such effort.

We agree that the disposal of liquor on the land has but a limited application in relation to the total volume produced. We would go further and say that were farmers' present consumption to be *doubled* it would still represent but a drop in the ocean compared with the total quantity of liquor available. And for this very reason we maintain that gas boards should not deny to farmers their small requirements wherever a supply of suitable liquor can be put at their disposal. After all, transport is largely the contractor's problem, not the gas industry's.

Mr. Diamond's reference to the committee sitting to consider the standardization of tanker vehicles is most interesting. It is the first we have heard of it, and we thought it worth while to ask two big firms of spraying contractors—firms who handle between them the bulk of this work in the southern counties—if they had heard of it either. Rather as we expected, neither of them had. Indeed, one of them seemed just a little indignant that at a moment when they were actively engaged in trying to adapt a suitable type of vehicle others were officially investigating along precisely parallel lines without their knowledge. Much time, effort and money might be saved if *all* contractors concerned were advised in advance of such work.

That there is still much difference of opinion on the economics of liquor disposal on the land is confirmed by Mr. Diamond. This is why we advocated greater co-ordination of policy at top level, since differences of opinion on questions of policy are not desirable in any industry. As we have said, there is ample room for both means of disposal, and our only concern is the most efficient, economic and practical means. Due regard must be paid, however, to the fact that by direct application to the land we are serving the national interest by saving dollars on imported sulphur besides providing nitrogen in a form which has many outstanding advantages. It is surely for the contractor and the farmer to make the final decision on the economics of liquor spraying after we have quoted the cost of the liquor at works or storage depot. In most circumstances there is a comfortable margin below the cost of applying solid forms of nitrogen at equivalent rates.

Personal Notes

MR. K. MACGREGOR has been appointed Technical Director of the coke oven department of Simon-Carves, Ltd. MR. J. E. CHICK becomes Technical Director of the washery department; MR. L. BROOK, Technical Director of the power plant department; MR. A. E. TAYLOR, Technical Director of the chemical plant department; and MR. O. J. H. SIMON, Technical Director of the Chemical Plant Department.

MR. W. A. COATES has retired from the Board of Metropolitan-Vickers Electrical Co., Ltd. He will continue as Commercial Consultant to the Managing Director until the end of the year. Mr. Coates, who has been with companies of the A.E.I. Group for a total of 50 years, has also resigned from the boards of Metropolitan-Vickers-GRS, Ltd., Newton Victor, Ltd., and Sunvic Controls, Ltd.

MR. H. ALLERTON, Engineer and Manager to the Llandudno undertaking of the Wales Gas Board, was successful in a three cornered contest at a recent Llandudno Council election, polling a clear majority over the two opposing contestants.

COUNTY ALDERMAN SIR HARRY HARDY, a member of the North Eastern Gas Board Consultative Council, has been elected President of Morley and District Textile Society for the twenty-first year in succession.

MR. ROBERT COOPER, a Director of the Chatteris Gas Co., Ltd., for some years until nationalisation, has died at the age of 80 at his home, 8, Park Street, Chatteris, Cambs.

MR. R. BROWN, Dunfermline, and MISS M. F. FINLAYSON, Kirkcaldy, were presented with gifts at Dunfermline last week in recognition of their 40 years' service in the gas industry.

Correspondence

A QUESTION OF POLICY

FROM: G. le B. Diamond, C.B.E.

DEAR SIR,

I do not readily embark on correspondence in the Press even though it be our own friendly 'GAS JOURNAL,' but I feel that your editorial article entitled 'A Question of Policy' in the issue of July 11, calls for a reply. I am Chairman of the Gas Works Effluents Committee, but what I have to say is a personal expression of view.

From the national standpoint it is fundamentally correct that anything which will add to or bring about the fertility of the soil should not be wasted. The policy of putting good ammoniacal liquor down the drain is one which many have deplored and that is one of the reasons why much attention has been given to the disposal of liquor on the land. Valuable technical papers on the subject have been published in the 'GAS JOURNAL,' notably, 'Ammoniacal Liquor as a Fertilizer,' by Dr. A. Marsden (No. 4728 of January 13, 1954, page 91), and 'Ammonia Liquor as a Fertilizer,' by H. M. Lawrence (No. 4829 of December 21, 1955, page 775). An informed contribution by Mr. Gordon Newman also appeared in the *Farmer and Stock-Breeder*, dated April 3, 1956.

There is no excuse for a lack of knowledge on what is being done. Economically and technically, however, the disposal of liquor on the land has but a limited application in relation to the total volume produced annually. The question of the suitability of the land to receive nitrogenous liquor in this form has to be considered and not a great deal is known. The location of the producing works is or great importance for, generally speaking, it is not economic to distributed outside a radius of 20-25 miles. The cost of distribution from gasworks situated in cities and large built-up areas is quite hopeless. Moreover, all large gas producing units are equipped to-day with concentration or sulphate plant, but there is much to be said for the practice in country districts where there is not a long haul to the farms. Storage is another problem that has to be considered for there are long periods of the year when the application of liquor is unsuitable or impossible.

It is incorrect to say that the recent liquor display at the Royal Counties Show at Poole was the first such exhibit at any agricultural show for displays have been staged at suitable agricultural shows in the Midlands and elsewhere for the past three or four years and I know that other boards have taken similar action. Much has also been done on the technical side and there is a committee sitting to consider the standardization of tanker vehicles. The type of spray used, the weight of the vehicle (because of soft ground), the width of the vehicle (because of passage through farm gates) and the corrosive action of the liquor, all have to be taken into account. Finally, there is the vexed question of charges and availability.

Many critics of the nationalized industries have praised the autonomy of the area boards in the gas industry. There is no doubt that autonomy has brought great advantages, but it has also been accompanied by problems. It is no secret to disclose that there is much difference of opinion on the economics of the disposal of liquor on the land. The Gas Works Effluents Committee is only a technical advisory committee; it has no powers whatever to resolve disputes of this kind. It has, however, done an immense amount of work behind the scenes since nationalisation and, while problems of disposal will continue to obtrude, there is nothing like the volume of work, or the trouble there was seven years ago. A few years ago the Committee dealt with a case where the land used for a sewage farm was alleged to be suffering from too much gas liquor. Recently, I had a complaint from the same place that not enough liquor was being put down the drain and the farm had suffered in consequence. The tide has turned in the ocean of ammoniacal liquor as the final paragraph in your editorial suggests, but it is by no means in full flood.

Yours faithfully,

GEORGE LE B. DIAMOND,
Chairman.

West Midlands Gas Board.
July 17, 1956.

Diary

July 25-27.—ROYAL WELSH SHOW, Rhyl (Gas Council Stand No. 136).

July 26.—N.T.G.C.C.: Caxton Hall, London, S.W.1. 2.30 p.m.

July 31.—SOUTHERN G.C.C.—The Conference Room, The Civic Centre, Southampton. 11 a.m.

SAFETY FIRST

Transport drivers of the North Thames Gas Board covered more than 10.25 mill. miles in and around London during the past year, 632 of them qualifying for safe driving awards in connection with the safety first competition sponsored by the Royal Society for the Prevention of Accidents. Our picture shows C. J. Sexton (right), who has driven for 25 years without an accident, receiving his award from Mr. R. N. Bruce, Deputy Chairman of the Gas Board.

Chemistry Convention

THE *Convention of Chemical Sciences, 1956*, will take place in Paris from November 18 to December 3, at the same time as the 4th Salon de la Chimie-Caoutchouc-Matières Plastiques, the Société de Chimie Industrielle announces.

BRITISH JEFFREY-DIAMOND LTD.

An advertisement on p. 134 of last week's issue, headed 'The Top Names in Industry use B.J.-D. Crushers' omitted the advertiser's address, which is: British Jeffrey-Diamond, Ltd., Crusher and Industrial Division, 15-17, Caxton Street, London, S.W.1.

S.G.B. to Use Surplus Refinery Gas

TEN-YEAR AGREEMENT SIGNED WITH ESSO

IN little more than a year surplus gas from the Esso Petroleum Company's refinery at Fawley, near Southampton, will be used by households and industry in the district, as a result of a ten-year agreement concluded by the Company with the Southern Gas Board. By the agreement a total of about 17 mill. therms a year of refinery gas will be supplied to the Board. This, after reforming at Southampton, will give the equivalent of about 13 mill. therms of town gas each year. The Board is to lay 17 miles of 15 in. main from the refinery to Southampton works to take the supply.

This was announced by Mr. C. H. Leach, Chairman of the Board, at a special Press conference at Gas Industry House on Monday. He explained that as a result of the agreement the Board expects to save coal to the extent of 115,000 tons a year, and there will also be savings in the consumption of gas oil and heavy oil. It is hoped that the new main will be laid and other necessary work completed within the next 12 months, so that the Board can begin to take supplies of gas from the refinery during the summer of 1957. The flares at the Fawley refinery will not disappear completely as a result of this project, as it is necessary, for reasons for safety, to keep a minimum amount of gas burning in this way.

In most of the distillation and cracking processes which are carried out at an oil refinery there is an automatic production of large quantities of many different types of gases. The volume and composition of these gases depend upon the particular plants in operation and upon the way in which they are being operated. Changing demands for the various products of a refinery will affect both quantity and quality of the gases produced. The refineries can use some of the gas as a substitute for oil for heating the boilers which raise the large amount of steam needed for various processes. In addition, provided that there is a suitable market, some of the constituents of the gas can be converted to chemicals needed by other industries. The surplus gas is taken to a flare tower where it is burnt, and all oil refineries are characterized by a large, luminous flame at the top of a tall tower. The flare is extremely important for the safety of the refinery, because the gas in the tower, and consequently in all the operating plant, is kept under pressure and therefore prevents the ingress of air which might otherwise cause an explosion and fire. It is essential, therefore, that each refinery has at all times a surplus of gas to burn so as to ensure this important safety provision.

Properties of Refinery Gas

The refinery gas has a heating value about double that of ordinary town gas and could not be used in its normal state on ordinary gas appliances because it would produce a large, very smoky flame which would be intolerable. Gas appliances could be modified to use refinery gas quite satisfactorily, but then they would be incapable of burning ordinary town gas in a satisfactory manner. One important quality of the refinery gas available at Fawley is that after normal purification it contains a negligible quantity of sulphur compounds.

Three Types of Usage

Refinery gas can be used for a town gas supply in three general ways: Added to a normal, existing town supply; in complete substitution for an existing town gas supply, entailing alteration to all gas burning appliances; or by modifying the properties of refinery gas in such a way that the resultant gas may be inter-changeable with a normal town gas supply with no adverse effect on the appliances.

So far as the Southern Gas Board is concerned, the first method is not attractive, as the cost of a pipeline to convey the relatively small quantities of refinery gas which could be used would be uneconomic.

The second method is impracticable, because there would be insufficient refinery gas available, there would be a considerable cost in converting customers' appliances, and all existing gasworks' manufacturing plant would become redundant. It is necessary for the refinery to close down a large proportion of its plant for several weeks each year and during that period the availability of refinery gas would be very low. Consequently, conventional gas-making plant must be kept in being to supply gas during this period.

The third method is technically and thermally the least efficient, but it does enable refinery gas to be used in any required proportion. The desired change in the properties of refinery gas can be brought about quite easily by the so-called 'reforming' process whereby the constituents of refinery gas are changed by chemical means into those which are already normally present in town gas. This process can be carried out in water gas plants already existing at the main gasworks without a large expenditure of money. In addition to its use as a source of town gas, refinery gas can be used in place of coke for heating retort settings and boilers.

The possible use of refinery gases from Fawley was first raised by the Board with the Esso Petroleum Company two years before the refinery was put to work in 1951. At that time the Esso Petroleum Company could not be sure of the quantity and quality of the gases which would be available for disposal, since this depended upon the markets for their various products, not then ascertainable with any precision. Consequently, they were unable to guarantee the availability and continuity of refinery gas in a sufficient quantity to make it economic or possible for the Board to use it. The Southern Gas Board were also in some difficulty because at that time many technical developments were taking place in the field of gas production, and it was not easy to see clearly ahead for the period which would be needed to make any scheme for the use of refinery gas economic.

Notwithstanding these difficulties, negotiations continued and examinations of the technical aspects of the possible use of refinery gas for specific projects were pursued. The whole question was further complicated by the fact that even if continuity of supplies could be assured, market conditions and prices were changing very rapidly, and it was difficult for either party to envisage with any certainty a future policy which would be satisfactory in all circumstances.

Pattern of Future Demand

More recently, as production at the refinery has progressed, the Esso Petroleum Company have been able to obtain a clearer picture of the pattern of a future demand for various petroleum products. The Board also are now able to see more clearly the probable impact of new gas-making techniques which have been developed since the war. In consequence, in the summer of 1954, the Board were able to accept suggestions regarding availability, contract periods and prices, including the guarantee of a considerably greater quantity of refinery gas than hitherto, giving possibilities of a much wider scope for its use by the Southern Gas Board.

This revised information regarding availability, contract time and probable price enables the Board to make further calculations into the economic aspects of various methods of utilizing refinery gas, and has finally resulted in the drafting and signing of a suitable agreement.

Benefits of the Agreement

In considering the use by the Board of refinery gas it it felt that this should bring about the maximum saving in coal and gas oil subject to the necessity to ensure that there is no undue reduction in the amount of coke available for sale. The latter consideration is important because the demand for coke in the Southern area is greatly in excess of production, and anything which can be done to limit the amount which has to be imported from other areas is obviously an advantage, particularly in view of the greater demand for coke which may result from the passing of the Clean Air Act.

CANCEL LATEST INCREASE, N.G.B. IS ASKED

Action by Newcastle Chamber of Commerce

Newcastle-on-Tyne and Gateshead Chamber of Commerce has asked the Northern Gas Board to cancel the recent increase in gas charges.

Mr. R. A. Cookson, stated he had been a member of the Gas Consultative Council for four years and he knew that the Gas Board showed great restraint in deferring as long as possible, the raising of prices.

Mr. P. Dalgleish pointed out that the North-Eastern Electricity Board had not increased its charges and he suggested that the Gas Board be asked to delete its last increase.

The finals of the 'Miss Leamington 1956' competition were held at the conclusion of Flavel's fête and sports day which took place on their grounds at Arlington Avenue, recently. Our picture shows actress Hazel Court and her husband, Dermott Walsh, two of the judges, with the first, second, and third winners.

THE LIGHTS OF TWO CITIES

OF a total of 30,713 lamps lit by the City of Sheffield Lighting Department at the end of March, 11,468 were gas-burning. During the year 51,835 gas mantles were used, while the number of panes of glass used in gas lamps was 6,985.

This information is contained in the annual report of the Department.

Much trouble had been experienced with malicious damage to street lighting during the year, 1,987 panes of glass in gas lamps having been broken. The cost, together with damage to electric lamps amounted to £584.

1,000 Miles of Lighting

When he was re-elected Chairman of the Liverpool Corporation City Lighting Committee recently, Alderman Hugh Carr told the members that the city had 36,000 lamps spread over 1,000 miles of roads, streets and passages. Ninety five gas lamps had been added to the lighting of side streets during the year.

They were proceeding with their scheme for the conversion of steet lighting from gas to electricity which would take between ten and 15 years to complete and would cost £600,000.

Alderman Carr said that during the last year malicious damage had again been enormous, and 32,122 glass sides of street lamps had had to be replaced together with 2,812 electric bulbs. It had cost the city £4,450 and for several years the annual cost had been about £5,000.

Sculpture in Showroom

With typical Welsh love of innovation Cardiff undertaking recently staged an exhibition of sculpture in the rest room of their City showroom. It was arranged to tie-up with a window display.

Opened by Sir Percy Thomas, O.B.E., the exhibition was so successful that it is hoped to make is an annual event.

ST. ANTHONY'S WIN N.G.B. FIRST AID COMPETITION

THE first aid competition of the Northern Gas Board took place in Newcastle-upon-Tyne recently, when teams from North Shields, Blyth, St. Anthony's by-products works, Darlington, Hartlepools and Sunderland participated, having won eliminating contests in the various divisions of the board.

The St. Anthony's team were the winners of the area competition and the Sunderland team were runners up. The members of the winning team were Messrs. D. E. Greig, J. W. Reynolds, W. Johnson, and D. Parkin. Mr. G. Ludford was the team's reserve man.

At the close of the competition, which had been judged by Dr. J. M. Kelly, of Sunderland, and Dr. J. Rich, of Newcastle-upon-Tyne, the challenge shield individual prizes were presented to the members of the winning team by Mr. J. E. White, Deputy Chairman of the Northern Gas Board. The winning team will represent the Northern Area in the gas industry national first aid competition which will be held in London in October next under the auspices of the St. John Ambulance Association.

East of Scotland Junior Golf

The annual golf outing of the East of Scotland Junior Gas Association was held over the King James VI golf course, Moncrieffe Island, Perth, last month, when some 20 members and friends took part.

Mr. J. C. Macdonald, retiring President of the Association, welcomed the golfers to Perth and Mr. D. J. Colvin, Edinburgh, presented the prizes.

The results were as follows: Members—1st prize and President's putter, Mr. J. MacNaughton, 70 – 3 = 67; 2nd prize, Mr. T. R. Cameron, 86 – 18 = 68; 3rd prize, Mr. I. Drummond, 87 – 18 = 69.

Visitors—1st prize, Mr. J. Henderson, 82 – 17 = 65; 2nd prize, Mr. D. Laing, 85 – 14 = 71.

Hidden hole prize—Shared by Mr. D. J. Colvin, Mr. J. Henry, and Mr. J. T. Christie.

Lucky card prize—Mr. I. Anderson and Mr. A. Jackson.

Consolidation prize—Mr. J. T. Pay.

COKE SALES CIRCLE AT CHRISTCHURCH

FOR their summer outing the London and Counties Coke Sales Circle recently visited Christchurch, members assembling at the King's Arms Hotel, where they had luncheon.

After lunch the party divided into three sections for visits to Hurn Airport, where the Air Training Course, and the Vickers Armstrong works, were seen; Poole Potteries and Tile Works; and the De Havilland Aircraft Co. Ltd., where the 'Venom' fighter and the new De Havilland 110 were seen under construction.

16

OIL GASIFICATION PLANTS

(HALL PROCESS OF AMERICAN GAS ASSOCIATION)

now in operation* or under construction†

		Number of Sets	Millions cu. ft./day
TWO SHELL SETS	† ALFORTVILLE, FRANCE	1	6·5
	* BROCKTON, MASS.	1	5
	* CAMBRIDGE, MASS.	2	13
	† **GLOUCESTER, ENGLAND**	**1**	**1·5**
	* LOWELL, MASS.	1	5
	* LYNN, MASS.	1	6
	* LYNN, MASS.	2	9
	* NEW BEDFORD, MASS.	1	5
FOUR SHELL SETS	* BALTIMORE, MARYLAND	1	5·5
	* CAMBRIDGE, MASS.	1	5
	* FRAMINGHAM, MASS.	1	5·5
	* GENNEVILLIERS, FRANCE	1	2·5
	* MANILA, PHILIPPINE ISLANDS	2	3
	* NEW BEDFORD, MASS.	1	6·5
	* NEWPORT, RHODE ISLAND	1	3
	* WORCESTER, MASS.	1	5·5

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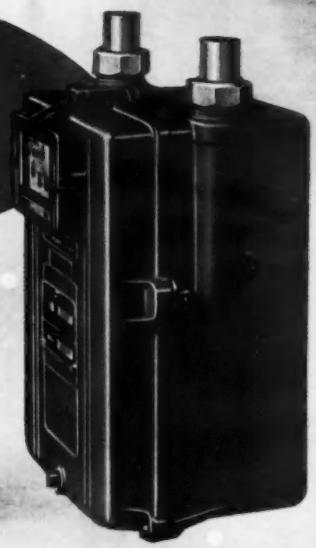
BEGWACO

Flomaster



A square deal from any angle–

—for both Board and consumer. The Flomaster is the most efficient meter for accurate registration of gas flow at *all* rates—even at .5 cu. ft. per hour. Its outstanding performance and appearance are due to advanced light alloy die-casting techniques, and to scrupulous testing at every stage of manufacture. The case is in two parts, and removal of five screws permits quick access to the mechanism. The Flomaster's a fine job—whichever way you look at it.

BEGWACO METERS LIMITED · QUEEN STREET · FARNWORTH · LANCS

Sir Harold Smith's Younger Daughter Weds Farmer

THE wedding took place at St. John's Church, Hartley Wintney, Hants, yesterday, of Diana Margaret, younger daughter of Sir Harold and Lady Smith, of Cowslade Farm, Hartley Wintney, and John Edward Hazell, son of Mr. and Mrs. H. E. Hazell, of Grange Farm, Hartley Wintney.

Miss Smith was given away by her father, Sir Harold, who is Chairman of the Gas Council, and the reception was held at Cowslade Farm. The service was conducted by Rev. J. A. P. Hoskyns.

HONEYMOON IN IRELAND

The bride wore a full length dress of white brocade with veil and tiara and carried a bouquet of roses. The bridesmaid, Miss Ann Callingham, was attired in blue grey grosgrain with headdress and bouquet of mixed flowers.

The best man was Mr. Robin Avery Wright. The honeymoon is being spent in Ireland and the bride travelled in a grey suit.

The elder daughter of Sir Harold and Lady Smith, Patricia, was recently married to John Gray, a farmer of Cheriton, Hants. Both daughters played a large part in running their father's farm. They share with Lady Smith the distinction of being accomplished musicians—all three holding the L.R.A.M. for which they all sat at the same time.

Romford works fire brigade seen in action during the exercise.

Romford Works Fire Brigade Fights Mock Oil Fire

AN interesting exercise was carried out recently at the Romford works of the North Thames Gas Board when a simulated oil fire was started near the new oil plant on the works. At 2.50 p.m., the works siren blared out its warning, and the works fire brigade together with the first-aid team raced into action.

Using foam apparatus, the fire brigade, comprising Messrs. E. Mann (senior), E. Mann (junior), Hopkins and Dunbar tackled the fire, which was well supplied with incendiaries and thunderflashes, while the first aid team, under the leadership of C. Reynolds, searched the building for casualties.

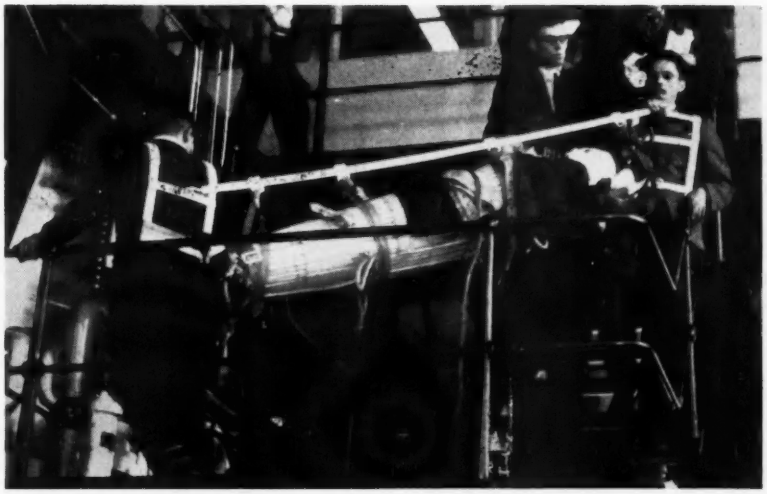
'Victim' Found

High up in the staging of the plant, they found a 'victim' (played by Mr. Richardson of the works) made up with realistic-looking injuries. A tricky situation presented itself here, as getting the victim out of the building necessitated descending several iron staircases, and negotiating many awkward corners.

Here, the value of the Lamond stretcher (invented by an engineer of the North Thames Gas Board) was proved, as with this stretcher, the victim is securely fastened, and is carried by two stretcher-bearers by means of a strap harness fitting over their shoulders. This means that the bearers have both hands free for negotiating stairs, corners, etc.

At 3.15 p.m., just 25 minutes after the first warning, the fire was out, and the 'victim' evacuated having been given first-aid treatment for burns and injuries. Altogether a highly-successful joint exercise, and a tribute to the fine voluntary spirit and enthusiasm of the works fire brigade and first-aiders who give up their spare time to keep themselves at such a high peak of readiness and efficiency.

Members of the first-aid team taking part in this exercise were Messrs. Reynolds (leader), Squires, Howchell, Aldis, Hyams, Wright, Eves, Crouch, and Bass.



Using the Lamond stretcher, members of the Romford first aid team get the 'victim' down from the staging in the oil gas plant.

THERE'S MONEY IN NEW IDEAS

Employees of the South Eastern Gas Board recently received cash awards for ideas submitted to the Board's suggestion scheme. Some of them are seen here discussing one of the ideas with the Deputy Chairman of the South Eastern Gas Board, Mr. R. H. Sandford Smith. Those who received awards were: D. W. Silverson, gas fitter, Horley; J. Symons, foreman, East Greenwich; P. M. Cortis, labourer, Rotherhithe; T. J. Ward, labourer, East Greenwich; A. R. Allwright, draughtsman and L. W. Barter, supervisor, Old Kent Road; F. E. Collins, foreman, Waddon Works; W. D. Haben, charge-hand, East Greenwich; E. D. Gardiner, chief cost clerk, Croydon; A. Milne, foreman, Streatham; R. P. Swann, fitter, Old Kent Road; and E. R. Candy, fitter, Portslade.

Another Price Rise in Northern Ireland

LURGAN (Co. Armagh) Borough Council is to increase the price of gas to all consumers by 6d. per 1,000 cu.ft., making the new tariffs 9s. 7d. per 1,000 cu.ft. for industrial and 10s. 4d. for domestic purposes.

Pointing out that the auditor's report on the gas undertaking for the year ended March last showed a net profit of £4,155, several members queried the need for the increase, but the Mayor pointed out that since March the price of coal had gone up by 7s. per ton.

A proposal that a decision on the Gas Committee's recommended increase of 6d. should be deferred until members had an opportunity to study the auditor's report was defeated.

Meanwhile a move to peg the price of gas in Belfast was turned down at a meeting of the City Council, recently, when Councillor Martin Wallace suggested that a Gas Committee proposal to increase the price of gas be referred back to see if the 'undertaking could freeze prices as in England.'

Councillor H. V. Kirk said the price of coal had been increased only a few months previously. If they were to stabilise the price of gas they could only do so after they had caught up with this last increase in the price of coal.

Councillor H. Fair said the increase of 4½d. per 1,000 cu.ft. was only to make up for the leeway that the undertaking had already lost, while Councillor Fair doubted whether this increase would prove sufficient.

Harrogate W.G.F. Celebrates 21st Anniversary

THE Harrogate branch of the Women's Gas Federation celebrated its 21st anniversary last month. Parties from the other branches in the area attended.

Dr. R. S. Edwards, Chairman, North Eastern Gas Board, who presided, introduced the proceedings and made an appeal to members to set an example with the use of coke. Since Pittsburg (U.S.A.) became a smokeless zone the inhabitants had enjoyed 65% more sunshine and an average rise in temperature of ten degrees, he said.

Mrs. G. Abbott (Chairman of the Women's Gas Federation) addressed the meeting and gave a message from Miss Halpin. Mrs. N. Walker thanked Mrs. Abbott and said how pleased they all were that she was able to come along.

Mr. Barney Colehan, the television producer, was the guest speaker, and talked about methods and difficulties of production. Mrs. L. W. Roberts thanked him.

A twenty-first birthday cake was cut by Mrs. Risdon who was one of the founder members of the branch.

Mr. R. B. Reynolds (left) an Alternate Director of George Wilson Gas Meters, Ltd., Coventry, is seen making a long service presentation to Mr. A. E. Broadhurst, of the company's Manchester branch, watched by Mr. H. Morris, Branch Superintendent, and Mr. G. Redhead, his deputy (extreme right).

N.E.G.B. Home Service Advisers Visit Radiation

TOUR OF WORKS FOLLOWS COOKERY DEMONSTRATION

A PARTY of 18 home service advisers of the North Eastern Gas Board paid a visit to the Leeds Production Centre (Wilsons & Mathiesons, Ltd.), of Radiation Group Sales, Ltd., at Armley, Leeds, to see a cookery demonstration by Miss S. M. Ashworth, and to hear a lecture by Mr. Eric Rolls, both of Radiation Technical Service Department.

The party, headed by Miss Sproule, of Hull, were received by Mr. Frank Harper, the firm's North Eastern Area Manager, and his assistant Mr. G. B. Hobson, and were welcomed by Mr. W. H. Christie, General Manager of Radiation Leeds Production Centre.

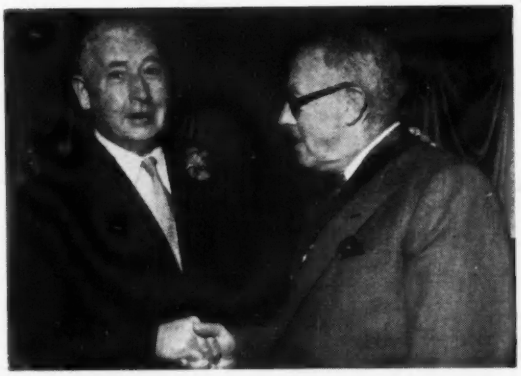
Best Results

Demonstrator and lecturer collaborated, Miss Ashworth describing how to get the best results in cake and scone baking by properly controlling the temperature of the New World 85 cooker oven, and Mr. Rolls explaining more technically the correct position and maintenance of the regulo and the gas points.

After lunch the party toured the works and saw the New World gas cookers being made.

CHANGE OF ADDRESS

Perl Controls, Ltd., have moved to larger and more up-to-date works at 45, Gatwick Road, Crawley, Sussex. Telephone: Crawley 25115/6. Some sales, technical and commercial staff will remain at the old Fulham address, however.



SUMMER MEETING IN GLORIOUS WEATHER

S.W. Section Ladies' Day Is Outstanding Success

FAVOURED by glorious weather, the summer meeting and ladies' day of the Institution of Gas Engineers, South Western Section, proved to be an outstanding success. A carefully planned programme ranging between Weston-super-Mare and Long Ashton, near Bristol, provided a day of social activity when members and their ladies renewed acquaintance in most attractive surroundings.

Dr. A. Marsden, M.B.E., Chairman, and Mrs. Marsden welcomed members, guests and their ladies in the morning. Mrs. Marsden 'held court' with the ladies for morning coffee in the drawing room of the Grand Atlantic Hotel, Weston-super-Mare.

Luncheon was by invitation of the Chairman of the South Western Gas Board, Mr. C. H. Chester, C.B.E. Prior to the luncheon, Mr. Chester referred to an insignia of office which the Section had provided to be worn by each Chairman during his year of office. On behalf of the Section he invested Dr. Marsden with the insignia (see picture above) a silver-gilt medallion attached to a ribbon collarette, bearing the names of the six Chairmen since the formation of the Section.

In view of the Section's close association with the education authorities in this area, the Chairman arranged with the Principal of the College of Technology, Bristol, for the students to make a gavel. This the Chairman had presented to the Section.

After luncheon Dr. Marsden proposed the health of the ladies and other guests, amongst whom he referred to Professor W. E. Garner, C.B.E. (University of Bristol), Mr. G. H. Moore, (Principal of the College of Technology), Mr. J. T. Haynes, O.B.E. (Hon. Councillor, I.G.E.), and Mr. A. G. Higgins (Assistant Secretary, I.G.E.); also Dr. H. G. H. Kearns, O.B.E., and Dr. J. T. Martin and Mr. M. Greenwood, O.B.E., with their ladies (all of the Long Ashton Agricultural and Horticultural Research Station, University of Bristol).

Mr. J. T. Haynes, O.B.E., a past President of the Institution and member of Council, replied.

Mr. T. L. Tallentire, Senior Vice-Chairman, thanked the South Western Gas Board for facilities to hold the meeting and for hospitality afforded to those attending. he also thanked Mr. J. D. Butler, Divisional Engineer and Manager, Weston/Taunton Division, for the arrangements for the meeting.

The party then made its way to the Long Ashton Research Station (University of Bristol), Long Ashton, Near Bristol, for an inspection and tour of parts of the station. The party split into groups and were conducted through the original cider orchard (planted in 1903), plant nutrition greenhouses, the dessert apples orchard, where they were shown various types of commercial spraying equipment in use—and through the centre for domestic preservation of fruit, vegetables, meat and poultry.

Dr. A. Marsden, M.B.E. (right), Chairman of the Section, talking to Mr. T. N. Dent, Area Development Manager, South Western Gas Board, in the grounds of the Long Ashton Research Station.

After the inspection, tea was served under the welcome foliage of the cider apple orchard.

So ended a most enjoyable day for a record number of 119 members, guests and ladies attending.

Members of the Section and their ladies at the Long Ashton Research Station. They are, left to right, Mr. T. W. Clapham, Production Engineer, Bath; Mr. P. Pincock, District Manager, Torquay; Mr. F. C. Gay, District Manager, Bristol; Mr. D. W. G. Scott, Production Engineer; Mr. S. S. Brown (Retired) formerly Engineer and General Manager, Exeter Sub-Division.

COMPANY REPORTS

Credit Squeeze Hits Meters Ltd.

THE credit squeeze and its effect on their chief customer, the gas industry, together with the increases in wages, materials, power, and transport, had made the past financial year difficult, Mr. V. A. B. Hughes, Chairman, stated at the annual meeting of Meters, Ltd., recently. Net profit had fallen from £38,788 to £29,600.

Final dividends were recommended of the usual 2¼% on the Preference stock and 4% on the Ordinary stock. The final payment on the Ordinary, together with the interim dividend already paid made 7% for the year, equivalent to 12¼% on the old Ordinary capital before the bonus issue made in the year to March, 1955. It was proposed to place £10,000 to general reserve, making this £80,000. The carry forward had increased slightly from £22,963 to £23,732. The value of the company's stocks had increased by £10,000 during the year but this had been due more to increased values than to an increased volume of stock, the chairman continued.

The new subsidiary company producing domestic appliances had had a better year than had been anticipated in view of the reorganization which had been necessary. They could look forward, with confidence, to receiving a gradually increasing return on capital invested. The difficulties which the credit squeeze was causing in the sale of the products of this subsidiary must, however, be stressed.

Research and development in the gas meter, textile, and other industries had been continued, and, whilst many projects were necessarily of a long term nature, some were reaching fruition. On the other hand, some had disappointed expectations.

After careful consideration of the prospects in the gas meter industry, the Board had decided to effect concentration of productive capacity, so as to avoid duplication in production. Each of the three main works would in future specialize on particular products. Whilst, naturally, there would be many difficulties to be overcome in making these changes and maintaining production, they believed that the resultant outcome of the changes would be beneficial not only in respect of the standard of quality of their products but also to the future financial strength of the Company.

One of the main works was becoming more closely engaged in the production of high class engineering products for supply to the Government and to the aircraft industry. The Board had faith in the continued health and prosperity of the Company.

CLEAN AIR BILL WILL AID US— COALITE CHIEF

THE provision in the Clean Air Bill whereby the consumer would be financially assisted in replacing old fashioned domestic appliances in smoke control areas would favour the business of the company, Commander Colin Buist, Chairman, stated at the annual general meeting of Coalite and Chemical Products, Ltd.

In common with others, the chemical industry had already felt some of the effects of the credit squeeze. Generally speaking, trading conditions remained good apart from isolated weak spots where profit margins had had to be cut somewhat. A de-stocking exercise for financial reasons by certain of their chemical buyers had caused a temporary lull, but the position was now improving.

The future looked good, and they awaited with interest the effect of the Clean Air Bill upon the demand for 'Coalite.' They believed that their business would grow and continue to improve.

Net profit of the Group amounted to £293,336 compared with £238,650 in 1955. Ordinary dividend for the year was 12% absorbing £110,728 against 11% absobring £100,226. Carry forward was £127,289 against £116,373.

RAWLPLUG TO PAY 10% MORE

THE Directors of the Rawlplug Co., Ltd., recommend final dividend on the Ordinary shares of 40% less tax, for the year ended December 31, 1955, which, with the interim dividend of 10% already paid, makes a total Ordinary dividend of 50% (against 40% for the previous year).

Net profit before taxation of the parent company for the year was £466,058 (£380,591). Taxation absorbed £228,332 (£200,963). Balance brought forward from previous year was £400,877 (£378,761); balance for appropriation is £638,603 (£558,389). Group profits of the parent company and its subsidiary companies after taxation were £316,954 (£206,312). The subsidiary companies have made increased profits which have been carried forward in their respective accounts, and the undistributed profits of the group carried forward after appropriation are £737,759 (£513,769).

The Board of Directors propose capitalization of £100,000 of the company's reserves, and to issue to the ordinary shareholders, one fully paid bonus ordinary share for every two ordinary shares held. The Directors also propose to amend the articles of association, to increase the voting rights of the preference shareholders to compensate them for the consequent increase in the voting rights of the ordinary shareholders.

Simon-Carves to Increase Capital

SIMON-CARVES are to pay final dividend of 17½%, less tax, on the £1 mill. capital for 1955. An interim of 11¼% was paid on the £525,000 capital existing before the capitalization of £262,500 of reserves and the issue of 850,000 5s. shares at 2s. per share in September last.

At that time the directors anticipated a final dividend of 15%. For the previous year an interim of 10% was paid on £477,235, and an interim of 10% and a final of similar amount on £524,958.

Group net profit, before tax, has risen from £942,160 to £1,386,477, but there has been a change in the basis of accounting, the effect of which has been to increase the group net profit, before tax, for 1955 as compared with that of the previous year by approximately £145,000.

At the recent annual general meeting shareholders approved the Board's proposals that the capital of the company be increased to £2,000,000.

Resolutions were also passed for the capitalization of £500,000, being part of the balance standing to the credit of the share premium account, and for the scrip issue of one new Ordinary share of 5s. for each two Ordinary shares held.

CHANGES PLANNED

COMBINED profits of the Group after deduction of all charges for the year ended March 31, 1956, amounted to £889,991 against £646,160 the previous year, the preliminary profit figures of George Cohen Sons & Co., Ltd., show. Final Ordinary dividend is proposed of 7.5% actual, less tax, absorbing £107,813 (against 6.9%, absorbing £99,188), making a total for the year of 11%, absorbing £158,125 (9%, £128,063).

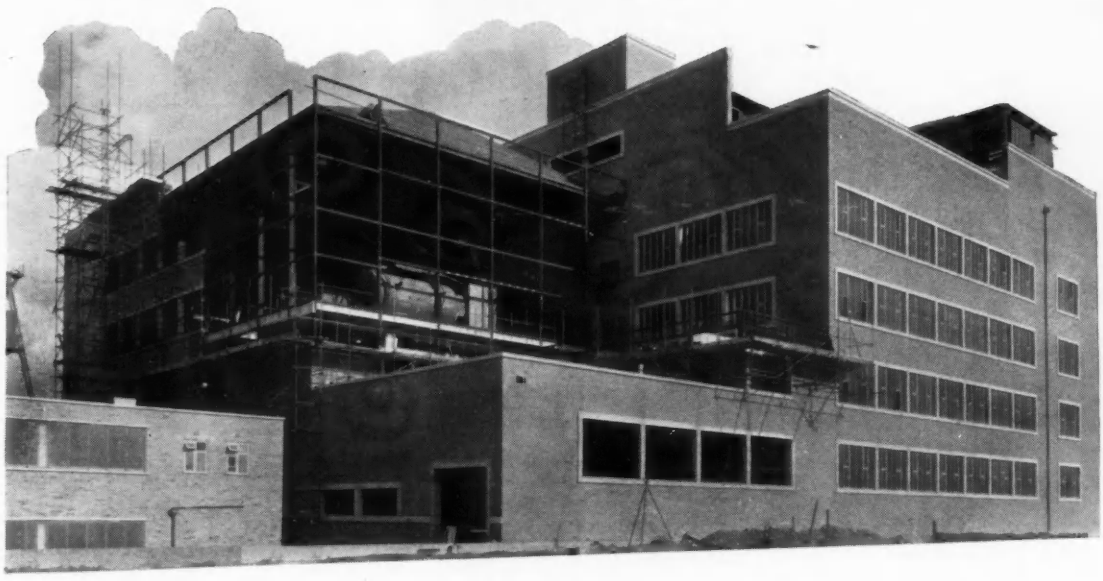
To simplify the Group's administration and control, it is proposed that the name of the parent company be changed to the George Cohen 600 Group Ltd., and that a new subsidiary company should take over the trading activities of the parent company, and adopt its present name, the re-named parent company becoming solely a holding company.

PROFITS NEAR RECORD

NET profit of the Group, before taxation, for 1955 was £605,851, within £2,228 of the 1952 all-time record, Mr. Claude Waylen Bell, Chairman, stated at the annual general meeting of Bells Asbestos and Engineering (Holdings), Ltd. Provision for tax amounted to £301,751 (against £291,999 the previous year).

Final Ordinary dividend of 15%, less tax, was recommended (against 12½% last time), absorbing £50,068 (£39,909). £505,492 was carried forward (£375,193).

Pipework for Denton . . .



. . . The photograph shows the Glover-West Carbonizing Plant under construction at the new Denton Gas Works for which we designed, manufactured and erected pipework in connection with the waste heat recovery plant—for steam, water and liquor services.

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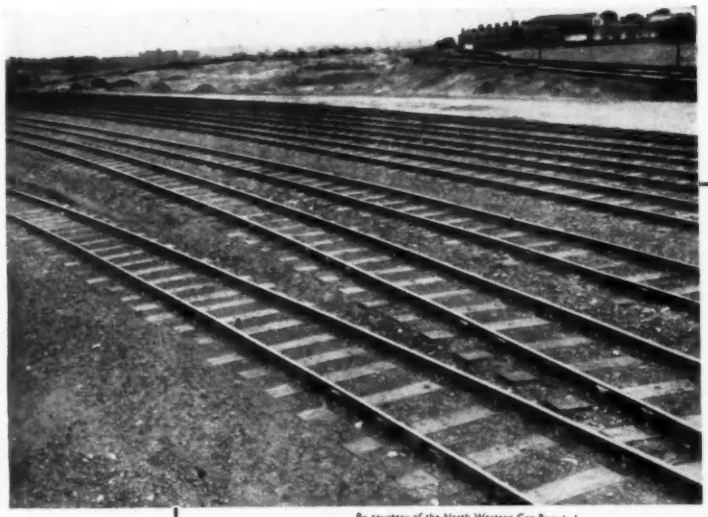

By courtesy of the North Western Gas Board

The whole of the Railway Construction for the North Western Gas Board at Denton was by Eagre Construction Co., Ltd.

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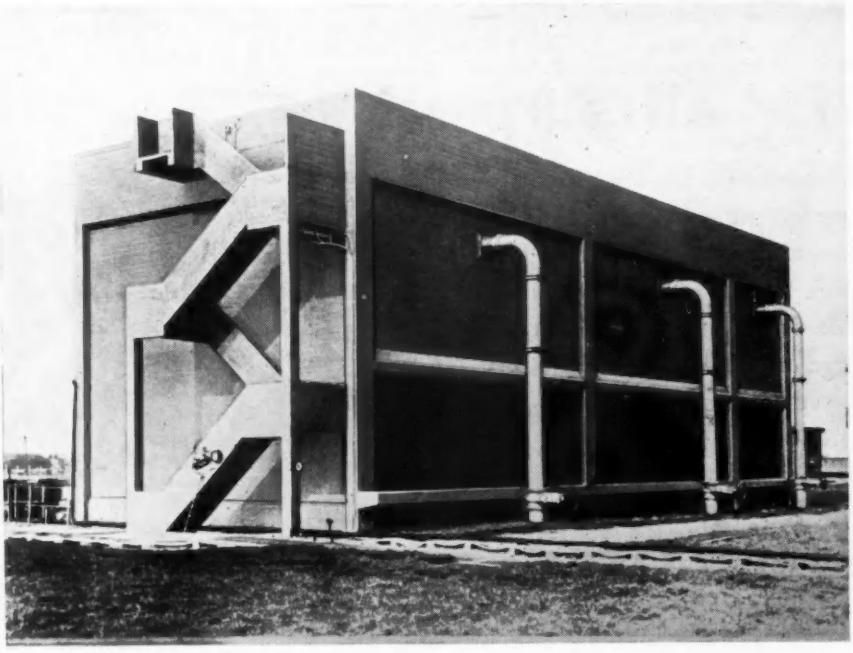

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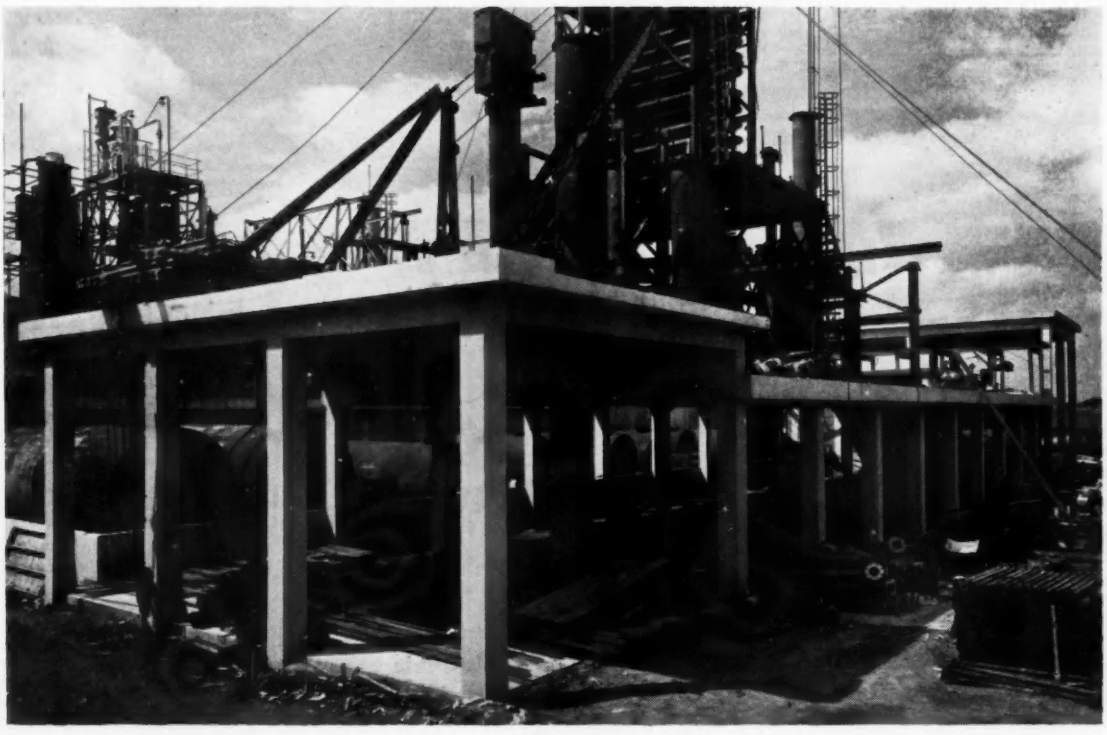
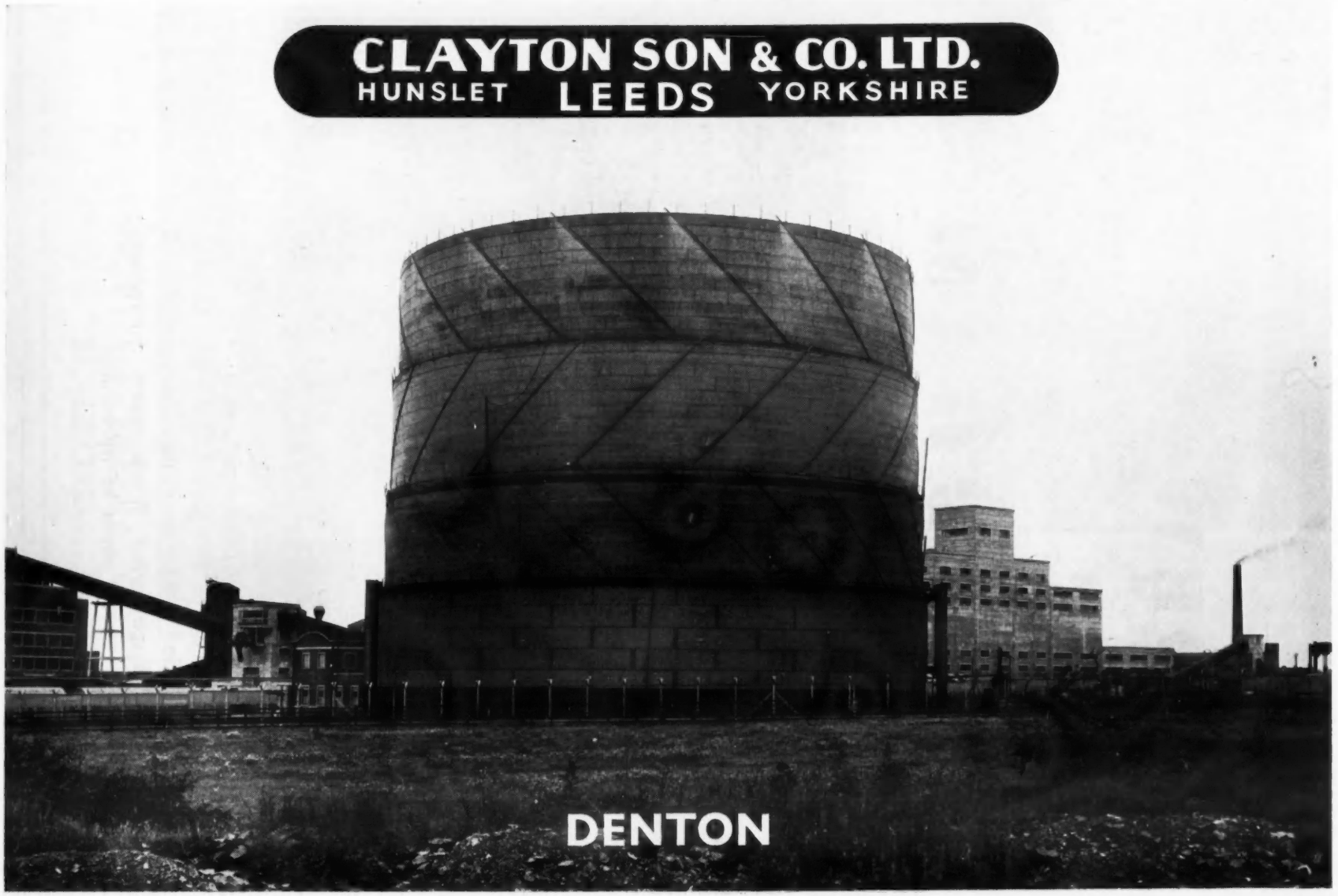


We have been engaged by the North Western Gas Board at the new Denton Gas Works on numerous types of Civil Engineering Work since commencement of operations.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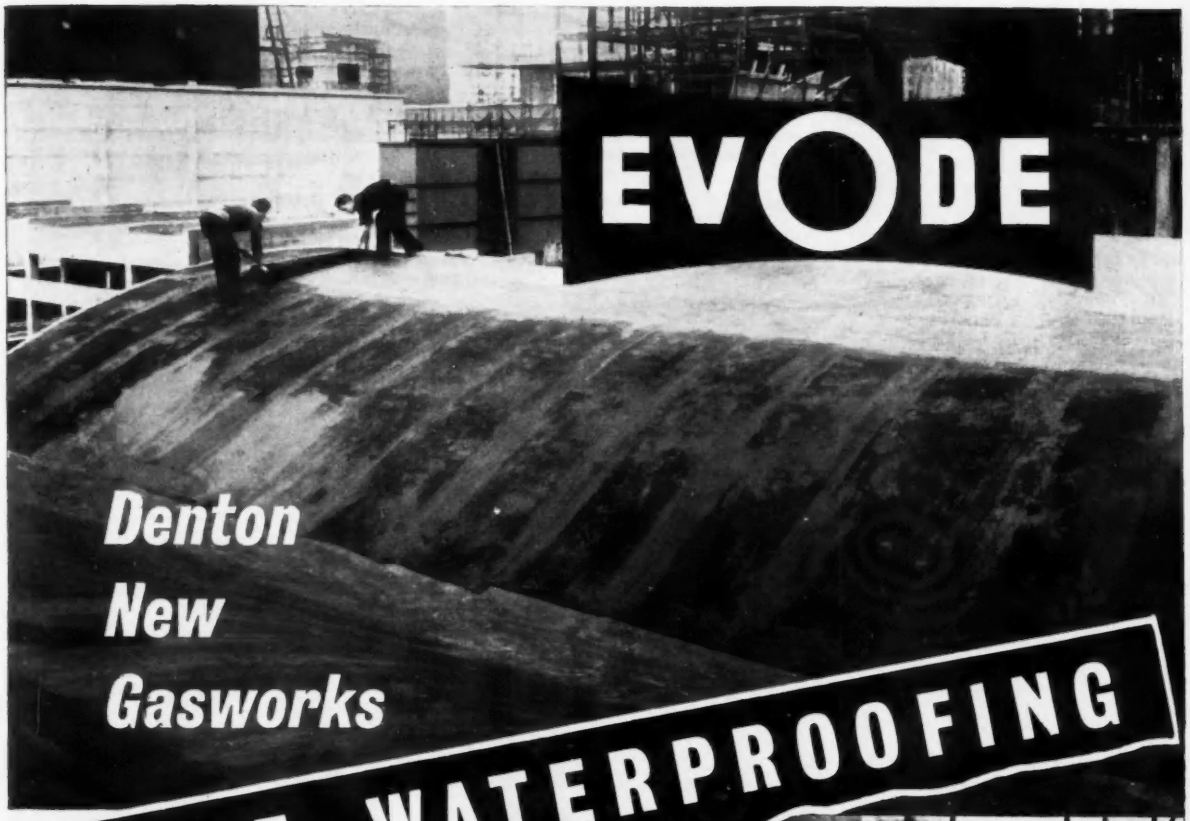

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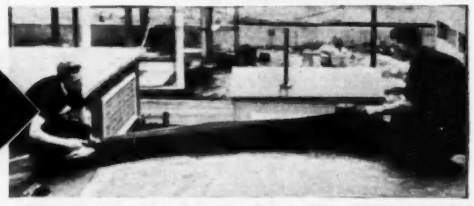
2 Bedding the membrane reinforcement

3 Finishing with Insulating Paste (TRADE MARK)

Photos at Denton New Gasworks, courtesy N.W. Gas Board. Main contractors, Messrs. Holst & Co. Ltd., Manchester, 14.

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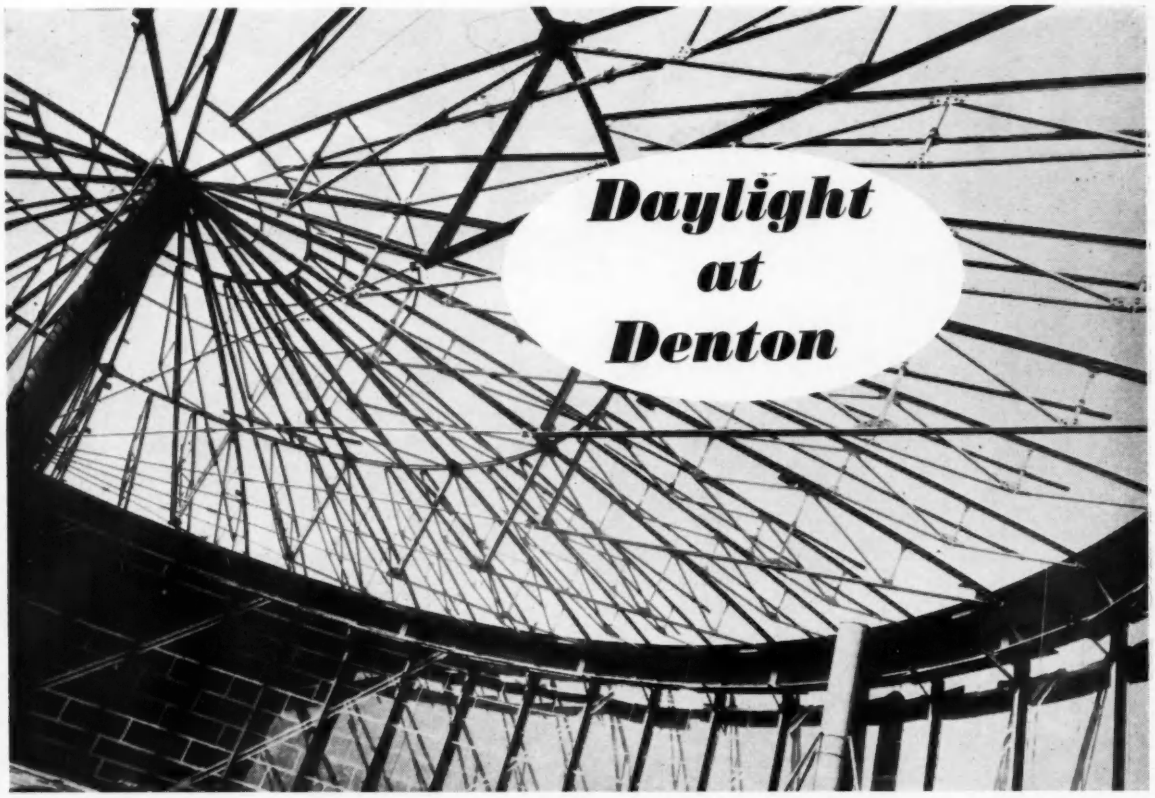


Daylight at Denton

FIRST STEP IN N.W.G.B. GAS-MAKING PROGRAMME

Specially written by **Charles J. P. de Winton,**
T.D., M.A., M.Inst.Gas E., M.Inst.F.
'Gas Journal' Technical Editor

THE new Denton gasworks which, it is hoped, will come into half-production some time early in September, is one of the most modern works in the North West of England. Although it is situated in the North Cheshire Group, only a proportion of the gas made there will be consumed in its own group, and the bigger proportion will be exported to the neighbouring Manchester Group.

The policy of the North Western Gas Board is to have several strategically placed gasworks which will be capable of supplying areas outside their immediate group boundaries. Denton works is one of these and others include the Higginshaw gasworks at Oldham, the works being planned at Lostock Hall, Preston, and the Garston works at Liverpool, which is now being extended to give a total output of nearly 30 mill. cu.ft. per day. All these works are being planned to have the best possible facilities for unloading coal, stocking and recovery, the most up-to-date plant for coke preparation for domestic use, and the very latest layout for fuel economy in steam raising and heat conservation.

The original Denton gasworks occupies the North Western corner of the present site. It was first built in 1884 and had been the result of an Act of Parliament, the Denton & Haughton (Gas) Act of 1880, by which a former Act under which the Dukinfield and Denton Joint Gas Committee had been set up, was terminated. This earlier Act had been passed in 1877 and had in turn superseded an earlier Act of 1854, by which the township of Denton had been supplied by the Dukinfield Gas Company.

The original works was extended and modernized in 1920 and continued operating until shortly after nationalisation in 1949, but water gas was still being made there until the works was finally closed down in 1951.

In 1938, the United Kingdom Gas Corporation acquired the gas undertaking from the Denton Urban District Council and it became part of the North Cheshire and District Gas Company which comprised the gas undertakings of Hyde, Denton and Dukinfield, all wholly owned by the parent holding company.

When the old works closed down it had an annual output of approximately 75 mill. cu.ft. in contrast to the estimated manufacturing capacity of the new works of 4,000 mill. cu.ft. per annum.

The original conception of the new works dates back to before nationalisation when the undertaking was part of the North Cheshire Gas Company and work was actually started in 1947. It involved the extension of the site from about 3 acres to 37 acres, the extra 34 acres being all agricultural land. The site of the new works may be looked upon therefore as a 'green field' site, an advantage which allows the designers full scope for the best possible layout and enables them to take full advantage of the most modern equipment for coal and coke handling, and railway siding layout, as well as the most up-to-date coal carbonization system and the best means of heat conservation at all points.

A good deal of preliminary civil engineering work was necessary to convert the site from a slope from east to west into a terraced formation. It can be seen from the works layout that the railway sidings are concentrated on the western side of the site at a fairly acute angle to the British Railways main line, instead of being laid out parallel to it as would have been a great deal more convenient for the marshalling of traffic.

Unfortunately planning permission could not be obtained for this layout because the Authorities had decided to build part of the new Manchester by-pass road over where the sidings would have been.

It was necessary to build up an em-

bankment for the sidings at this point as the original site slopes down very sharply here. All earth removed from other parts of the site in the course of levelling and terracing was brought over to help build it up. This included earth that had been excavated from the east part of the site where the coal tipplers have been installed. It was also necessary to form a cutting as the level was higher than at other parts of the layout. Added to this, it was necessary to transfer about 160,000 cu. yd. of burnt shale to complete the embankment.

In order to support the terraces formed on the site, retaining walls have been built which vary in height from 6 ft. to 15 ft. All these walls are of the cantilever type, except for the wall between the coke stocking area and the C.W.G. plant, which is of an abutment design. The reason for this is the possibility of pressure being exerted by the coke on rather a high wall.

All surface water drainage is taken to a nearby stream on the westerly boundary by pipes varying from 9 in. to 24 in. diameter and a total length of 3.83 miles. To prevent suspended solids in this water entering the stream it is proposed to build a treatment plant comprising grit channels and a sedimentation tank. All other effluents must first be treated to make them innocuous before entering the main Denton Council sewer which runs through the site.

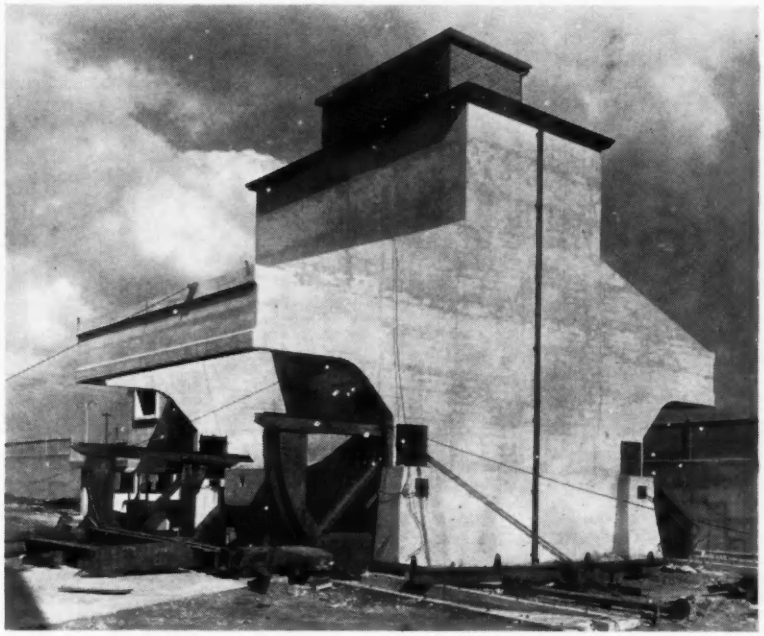
Sidings Layout

The main objects behind the sidings and coal handling plant at this works are two-fold: First, that provision must be made for a five day working week coming into operation for all gas workers other than shift men, and secondly, that if the works had the most up-to-date means of the stocking, and the recovery from stock, of its coal, it could be used to relieve pressure at other works. For instance, in periods of bad weather during the winter when deliveries of coal to other works were in danger of being delayed, deliveries consigned to Denton could be diverted, and at other times of the year, if coal deliveries were becoming embarrassingly unmanageable at other stations, these would be diverted to Denton where it can be put into stock and later recovered with the minimum of trouble and expense.

From the plan of the works, it can be seen that the sidings on the west side consist of six tracks, with a seventh branching off into the stores building. Onto five of these tracks wagons of coal are put off by British Railways' locomotive and are under the control of the main line signalling system, which in turn is indicated to the gasworks shunters and engine drivers to prevent them bringing back empty wagons or full wagons of coke from the east side of the works, while a train of wagons is entering the gasworks from the main line. Each of these tracks can hold a British Railways' engine and 45 wagons. The sixth track is used by the engine to return to the main line. The sidings are laid out in 95 lb. bull head rail laid to British Railways' standards and capable of handling 1,200 tons of coal per day. To save time in shunting and marshalling large numbers of wagons at yards en route, it is hoped that the N.C.B. will supply coal in block trains, *i.e.*, whole trains loaded at the colliery and despatched direct to Denton sidings. As all the coal carbonized is South Yorkshire, there is every possibility of this happening.

The full wagons are picked up by the gasworks diesel locomotives (two Ruston & Hornsby diesel shunters) and brought round to the coal tippler sidings, passing over a wagon weigh bridge. Here the wagons are handled by a 'beetle' which brings each wagon separately down to the 'Rotaside' tipplers (by Strachan & Henshaw) of 150 tons per hour capacity. There are two tipplers of this capacity in duplicate and they handle trains of wagons on tracks on each side of the coal unloading sidings. Wagons up to 24 tons capacity can be handled.

This coal tippler installation is separated from Oldham Street which runs down on the Eastern boundary of the works proper, by a reinforced concrete retaining wall, but this does not prevent dust rising up and blackening the area to the east. This area is occupied by neighbouring factories as well



Above: *Coal tipplers showing reinforced concrete building with canopy.*

Below: *Twin belt conveyor system to retort house.*

DENTON NEW WORKS
LEGEND
NORTH WESTERN GAS BOARD
TECHNICAL AND PLANNING DIVISION
OLDHAM STREET
MAYFIELD ROAD
WINDMILL LANE
LANCASHIRE FELT
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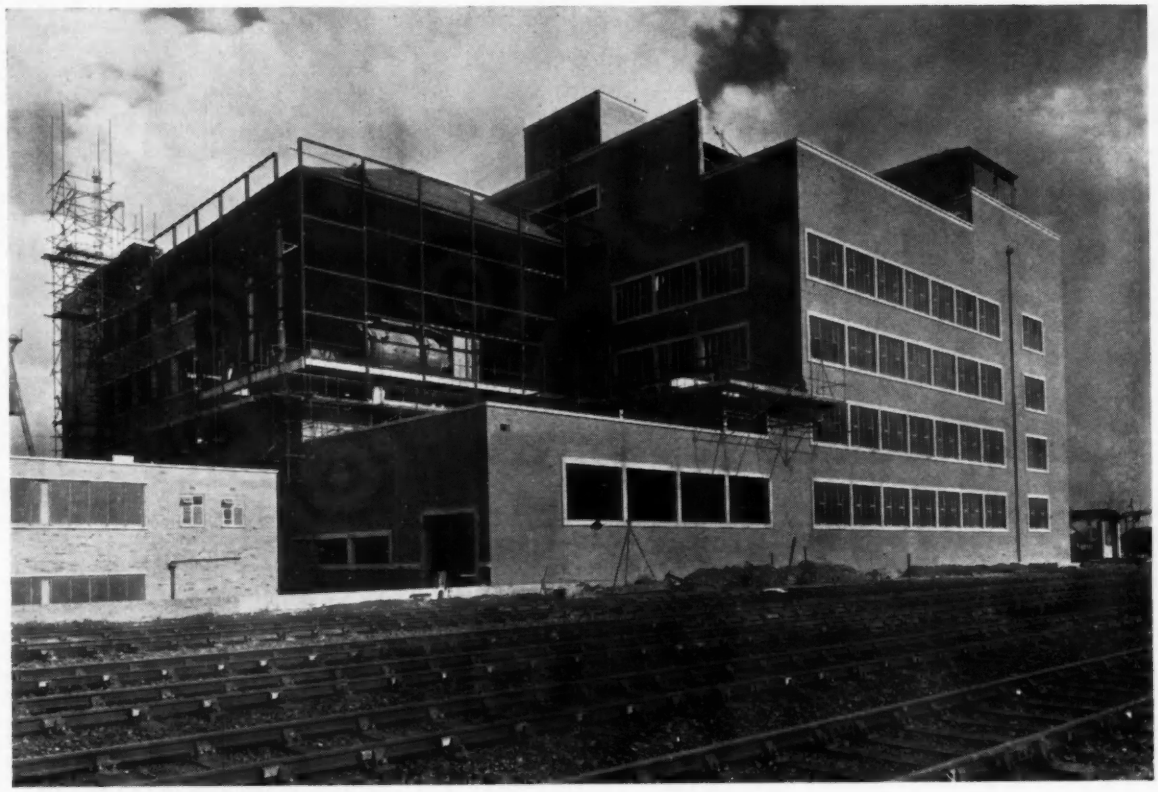


View of the retort house from the North West, showing waste heat boiler section under construction and main coal sidings.

as the North Cheshire Group Gas Distribution Control Room and other Gas Board buildings. To overcome this dust problem, a special concrete shell roof in the form of a canopy has been constructed over the tipplers and forms part of the tippler house. From tests carried out, this construction should quite satisfactorily contain the dust.

Coal Stocking

From the tippler pit the coal is carried by belt conveyor up to an intermediate conveyor station (No. 1 junction tower). From here there are two alternative routes for the coal. It can either be ejected at this point and be put into stock, or it can be transferred to a second belt conveyor and taken into the retort house bunkers. There has never been any difficulty in getting sized washed coal in South Lancashire and North Cheshire, so there is no coal crusher, but an electro-magnetic extractor for tramp iron has been installed at the retort house end of the main coal conveyor.

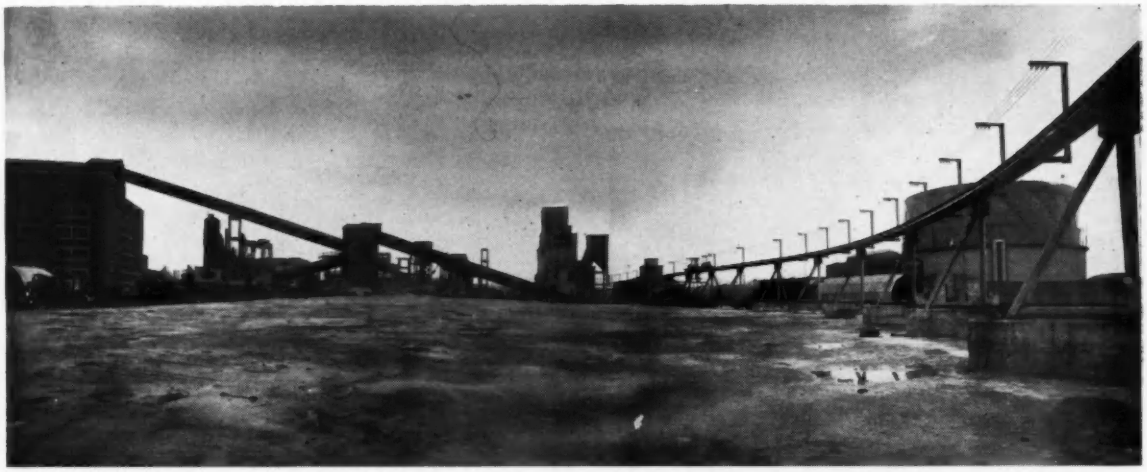
As these belt conveyors can and do carry coke as well as coal, a control room has been set up in this junction tower which includes a mimic diagram. By this means the operator can control the transport of coal, coke or breeze by this belt system as well as decide whether to stock coal, or to transfer it to the retort house, and in what part of the coal stocking area to stock it.

The coke stocking ground is roughly semi-circular in shape with an area of 17,557 sq. yards. Surrounding about 60% of this area is a monorail supported at a height of about 15 ft. on reinforced concrete supports. Above this are installed overhead wires for three phase power supply. On this monorail run two haulages mounted on carriages. The positioning of the carriages and the operation of the haulages is controlled from the central movement of coal and coke in No. 1 junction tower. At the base of this tower there is a third haulage. By means of a Henderson scraper which is actuated by the three haulages, coal can be transferred to any part of the stocking ground or to the base of the tower. Here, there is a ramp behind which there is an entrance to a conveyor belt system connecting with the main system of transport of coal from the tipplers to the retort house. By drawing in coal from the stocking yard up over the ramp, coal can be easily recovered from stock, and by drawing coal which is being rejected from the tower and accumulating there outwards, it can be put into stock equally easily. This operation is under the complete control of the operator in the tower. Coal can be stocked or reclaimed at the rate of 100 tons per hour.

A total of 46,000 tons of coal can be stocked.

Carbonizing Plant

The retort house is a fine, well proportioned modern building, with windows at every floor. At each floor level platforms are provided so that the windows can be properly cleaned inside at regular intervals with the window cleaners in perfect safety. The feeling when you enter the retort house is one of freedom of movement, with all the plant strategically placed for the job it is going to do. The producer gas plant consists of eight Wellman Smith-Owen Galusha mechanical producers of 10 ft. diameter and designed to use graded coke $\frac{1}{4}$ in. to $\frac{3}{8}$ in., or in other words, dedusted coarse breeze. By using this grading of coke, more coke becomes available for sale, but the number of producers must be doubled to make up for loss in gas generating capacity. Six producers, therefore, will be needed for firing the retorts on full output with the seventh and eighth as standbys. This arrangement will give an ample supply of producer gas for firing the settings and an auxillary supply for the raising of extra steam, should this be necessary. The producer fuel is brought from the coke screening plant after dedusting and joins the retort house coal conveyor system, and is transported into storage bunkers holding enough fuel for 72 hours production. The fuel is automatically weighed on being charged. The control of the producer is automatic, but the dipping of the fire, though carried out by hand, is made as easy and convenient as possible. The ash from the producer is continuously extracted and is stored in a hopper at the base and is emptied every shift into a Thomas water flow conveyor. This arrangement avoids the use of a belt conveyor running continuously at very low speed.



Coal stocking ground from the south, showing control tower in the centre to the left and the monorail surround. The compressor house is seen near the new gasholder.

The carbonizing plant consists of 160 50-in. West's continuous vertical retorts in four benches with five bends of eight retorts in each bench. The arrangement of the retort benches is most unusual. Instead of the long line of retorts either back to back or laid out in a succession of long narrow buildings, these benches are here laid out in four parallel lines, at right angles to the length of the building. Each bench can be operated completely independently, and has its own producer gas connections and waste heat boiler arrangements. The gas from the retort benches is divided into two streams of 6 mill. cu.ft. per day each, one stream from each pair of benches. The retort settings are constructed of 95% silica material made by Roberts & Magginis, Ltd., of Trefor, North Wales, except for the top three courses, a fireclay section at the base and the waste gas chambers which are constructed of high grade firebrick. The top iron work is the conventional type used with West's retorts, but the bottom iron work has been specially designed by the engineers of the North Western Gas Board's Technical and Planning Department. The worm type extractor gear is not the vertical helical type normally fitted to West's plants. Instead of the bottom half driving the top, the top is power driven and the lower half can be disconnected from it. This design will give easier access for retort spray welding. The bottom door is water sealed, emptying vertically downward instead of at right angles to the vertical facing inwards as is more usual with this type of plant. A hand operated moveable hopper loads the discharged coke on to a rubber conveyor belt which transports it to storage or the screening plant.

Power Plant

There are seven waste heat boilers, one for each bench with three standbys, and a producer gas main bringing gas direct from the producer gas plant to the waste heat boilers for boosting the supply of steam if wanted. The generator house is in the north east corner of the retort house. It contains three sets of W. H. Allen pass-out turbines directly coupled to Mather & Platt alternators of 1,200 kilowatt capacity at 3.3 kV, 3 phase, 50 cycles A.C. Normally two will be in use with one standby. The necessary switch gear has been supplied by Metropolitan Vickers, of Trafford Park. The whole set-up is well instrumented, and includes a waste heat boiler control room, from which the boiler's performance and steam consumption can be checked and controlled. Any power generated in excess of what is needed in the works between 8 a.m. and 5 p.m. is exported to the grid at ½d. per unit. Below the waste heat boiler room which is at the same level as the retort charging floor, and at the north western corner of the retort house, is the store for refractory materials. This is a particularly suitable place for this material, as it is both dry and warm, and will prevent the weather damaging high grade silica.

Steam Raising by Waste Heat

The waste heat boilers, by Spencer Bonecourt & Clarkson, are fitted with Weir de-aerator feed water heaters and economizers by Senior Economizers. Davidson sirocco fans driven by 36 b.h.p. electric motors are fitted to each boiler. Steam is to be generated at 265 lb. per sq. in., though the boilers are designed for a pressure of 280 lb. per sq. in. The pressure at the turbines will be 255 lb. per sq. in. When four boilers are in operation 40,000 lb. of steam per hour will be generated and superheated to 715°F. The direct producer gas connection mentioned earlier on (the augmentation flue) will, when in operation, be able to add a further 10,000 lb. of steam per hour. The boilers are fitted with economizers into which the feed water enters at 190°F. and leaves at a temperature 6°F. below the saturated steam temperature. The boilers are also fitted with de-aerators and a continuous blow down system.

Each steam turbine consumes 18,500 lb. of steam per hour at 225 lb. per sq. in. passing out 12,000 lb. at 15 lb. per sq. in. Under conditions of maximum steam consumption as much as 15,000 lb. of pass-out steam at 18 lb. per sq. in. can be made available per turbine. All condensate water is collected and returned via a condensate tank at 110°F. to the de-aerator at 190°F. and thence to the economizers. Feed water heaters by G. & J. Weir are fitted as a standby.

The superheaters are separated from the boilers and by partially by-passing, and the degree of superheat can be effectively controlled.

The bulk of the pass-out steam at 15 lb. per sq. in. goes to the ammonia effluent treatment plant and the remainder is used at the purifier plant, for retort steaming and for the heating of all buildings.

The steam for saturating the blast for the producers is provided by the steam generated in the producer jackets.

The two gas streams leave the retort house and pass to two Balfour V tube water-cooled condensers with capacities of 6 and 7 mill. cu.ft. per day respectively, on their way to the exhauster house. There are three exhausters, Holmes—Connersville 16 in. by 39 in., driven by B.T.H. Electric Motors. For safety reasons there is a rigid wall between motors and exhausters and the precaution is taken that no gas can pass into the motor room. Each exhauster has a capacity of 6 mill. cu.ft. per day and normally two will be working and one standby. The exhauster house is a reinforced concrete framed building with brick panelling and a flat concrete roof, and glass brick windows. It has a Plenum steam heating and ventilating system.

Ancillary Plant

The electric detarrers, four in number, are by W. C. Holmes Ltd. of Huddersfield and are placed on the roof of a reinforced concrete structure housing pumps for the transfer of tar and liquor. The two ammonia scrubbers also by Holmes are provided one for each stream. Each consists of two sections of 6 bays each with a rated capacity of 275,000 cu.ft. per hour or 6.6 mill. cu.ft. per day and are complete with the necessary liquor pumps. From the ammonia scrubbers

the gas passes to the tower purifiers, again by Holmes. The installation consists of six towers and two stocking towers and one standby tower. The purifier capacity is 12 mill. cu.ft. per day. The installation includes the necessary cranes, running on rails at either side of the towers and forming a bridge over the top, for taking off the purifier lids and handling all grids and the lifting and lowering of containers, etc. An oxide floor approximately 180 ft. by 80 ft. is provided for oxide preparation. The foundations for the tower purifiers take the form of a reinforced concrete raft approximately 3 ft. thick, with an average loading of 1½ to 2 tons per sq. ft.

At the outlet of the purifiers, the coal gas passed to the benzole washers by W. C. Holmes Ltd. The capacity of each of the two washers is 6.1 mill. cu.ft. per day, and the estimated daily make of

The main stairway to the charging floor in the retort house. On the right may be seen the platforms for the window cleaners.

crude benzole is 1,680 gal. From here the gas passes to the new 2 mill. cu.ft. gasholder by Clayton Son & Co. Ltd. of Leeds. It is proposed to build a second gasholder of the same capacity but this is being put off until a later date. These two holders will be situated along the eastern boundary of the works proper. Here the distribution department takes over from the production department, and so to be found here is the control room for the whole of the North Cheshire Group, the compressor house, and the gas testing house. The testing equipment is by Fairweather. Both the control room and the gas testing houses are attractively designed brick buildings, with reinforced concrete roofs, while the former has a special curb shape to accommodate the control panel.

Compressors

The compressor house is constructed of a reinforced concrete frame by Holst & Co. Ltd., with brick panelling. The design of the building allows provision for a gas tight wall separating the motor room from the compressor compartment with a flat roof over the motor room and a shell type concrete roof over the compressor room.

In the compressor house, the four Bryan Donkin compressors directly coupled through a reduction gear, to Lawrence Scott electric motors operating on the 3.3 Kv supply are of the twin reciprocating type and consist of two of five mill. cu.ft. per day, one of six mill. cu.ft. per day, and one of four mill. cu.ft. per day capacity. This gives a total compressor capacity perfectly adequate for the output of the works with ample standby. The distribution pressure is 20 lb. per sq. in. All heating in these and other buildings is done by low pressure pass-out steam at 15 lb. per sq. in.

C.W.G. Plant

At the end of the war it was decided to increase the capacity of the old Denton Works by installing some auxiliary gas-making plant. And so two 1½ mill. cu.ft. per day secondhand Power Gas Corporation plants were purchased from Firth Brown Ltd. and Tully carburettors were added. An Economic boiler was also installed. As all steam will be taken from the main works steam services, this boiler is no longer necessary and will in due course be replaced by a Humphreys & Glasgow 4 mill. cu.ft. per day blue water gas plant for dilution. The total gas-making capacity other than straight coal gas will be 4 mill. cu.ft. per day blue water gas and 3 mill. cu.ft. per day carburetted water gas.

Coke Handling Plant

All coke from the retort house is brought by twin conveyor belts to the conveyor belt station at No. 1 junction tower. From this point the coke is either taken to the coke handling plant for immediate preparation for sale, or else it is put into stock to be recovered later and subsequently screened.

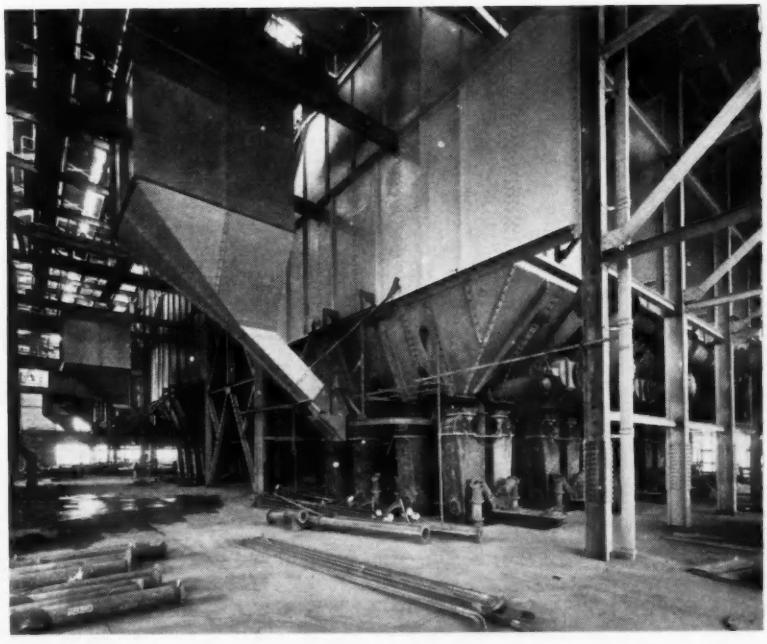
The coke stocking ground has an area of 11,279 sq. yd. and is approximately rectangular in shape, about 220 ft. by 465 ft. A gantry has been installed over this area to carry the necessary conveyor belt system. Coke can be either stocked over this area or by a connecting link transported by conveyor belt to the screening plant running parallel to the long side of the stocking ground. At each corner of the gantry spiral chutes are provided to minimize breakage of the coke when being put into an empty stocking ground. The method employed is to start stocking at any of the four corners allowing the coke to run down the chutes. A tall pile will be formed round or near the chute and by extending such piles over the stocking ground the distance the coke must drop will be minimized and the breakage reduced. A maximum quantity of 22,000 tons of coke can be stocked.

Coke Handling

The coke screening plant is by W. J. Jenkins & Pegson Ltd., and is housed in a well designed functional building in reinforced concrete, on the east side of the works near the coal tipplers.

There are four lines of screens installed, each rated at 40 tons per hour, which makes provision for screening coke direct from the retort house or from stock. Coke is reclaimed from stock by mechanical shovel which dumps it at the base of a skip hoist installed on the west side of the screening plant. This hoist, by Strachan & Henshaw, Ltd., delivers the coke to the top of the building on to an appropriate screen. Provision is made for bagging coke and loading road or railway wagons with bulk loads. Two travelling debreezers are installed, one for each form of transport.

The capacity of the coke storage bunkers is 1,000 tons. The normal sizes



View of the carbonizing plant, showing the top iron work, coal bunkers, and the coke charging bunker for use after scurfing.

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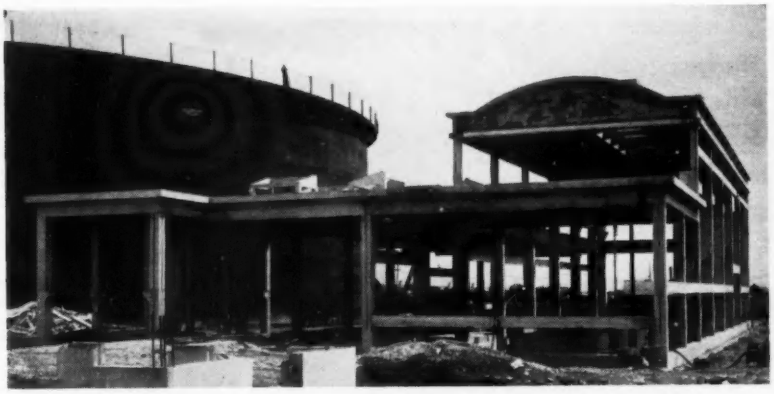


The compressor house under construction, showing reinforced concrete framework and the flat slab roof with the shell roof behind it.

of domestic coke, namely, Nos. 2, 3 and 4, are stored, and can be loaded from bunkers when needed. The breeze is stored, dedusted, and made available to the producer gas plant. The belt conveyors run the whole distance under both lines of bunkers so that whatever type of fuel is wanted for the producers it is to hand. These producer fuel conveyors connect with the main conveyor system to the retort house by means of which the required fuel can be transported direct to the producer fuel bunkers in the retort house. The breeze used for producer fuel is $\frac{1}{4}$ to $\frac{3}{16}$ and all fines or dust below this size is collected and sold to the electricity board.

Tar and Liquor Plant

The tar and liquor recovered at the condensers or any liquor from the ammonia washers or tar from the detarrers, collects in a separating tank, situated between the detarrers and the ammonia washers. This tank is big enough to hold 12 hours' make and the tar and liquor are therefore pumped out once a shift (once every eight hours) into the main storage tanks. There are two main tar storage tanks each of 150,000 gal. capacity. From here the tar is pumped into rail tanks which are put off from the main sidings. The make of tar is estimated at 13,000 gal. per day.

The crude liquor is pumped into the crude liquor storage tanks which consist of two steel tanks, each of 280,000 gal. From here it is fed to the ammonia liquor effluent treatment plant. Here the liquor is concentrated to give a product containing 20% w/w free ammonia, which is stored in two cast iron tanks each of 20,000 gal. capacity.

This plant is the result of experiments carried out by the staff of the old United Kingdom Gas Corporation, together with certain improvements and modifications made in the last few years, and it represents the most modern practice in gasworks effluent treatment. This has been made necessary by the severe conditions laid down by the Local Authorities before gasworks effluent may be allowed to enter the Municipal sewage system.

Effluent Treatment

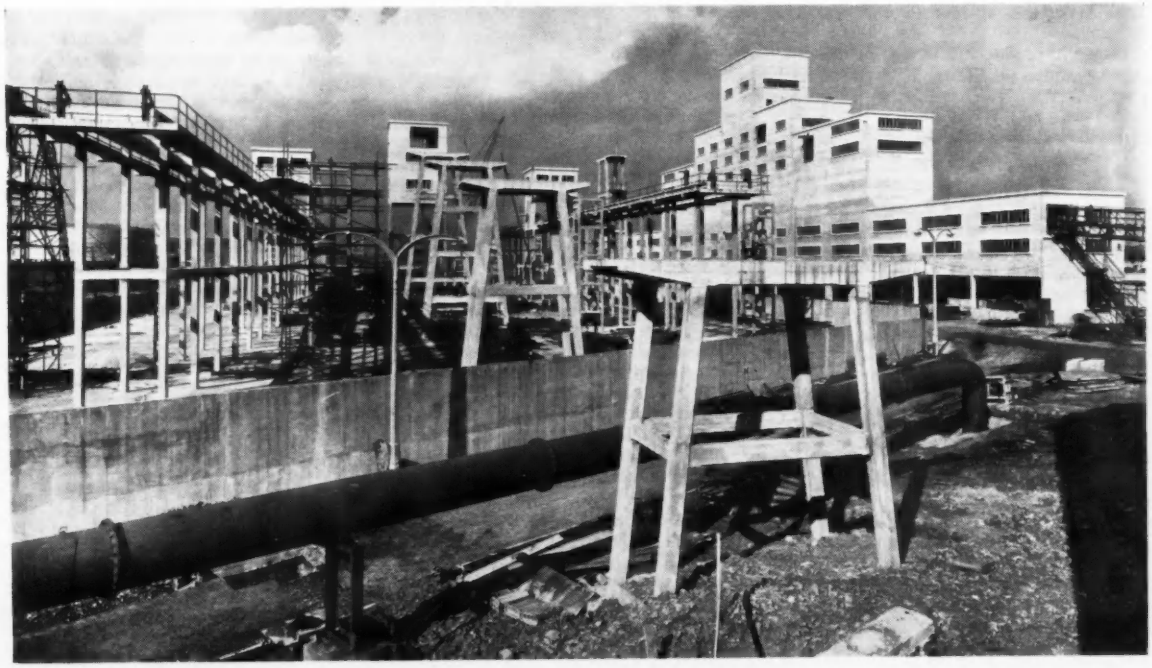
The plant may be divided up into several sections, as follows:—

1. Benzole dephenolating plant to remove monohydric phenols.
2. Concentrated liquor plant to give a 20% ammonia w/w concentrated liquor.
3. Quadruple effect liquor evaporation plant, producing solid ammonium chloride.
4. A methyl isobutyl dephenolating plant with suitable means of solvent recovery for the removal of polyhydric phenols.
5. Finally, an activated carbon absorption plant to remove any further traces of phenols to satisfy the sewage board authorities.

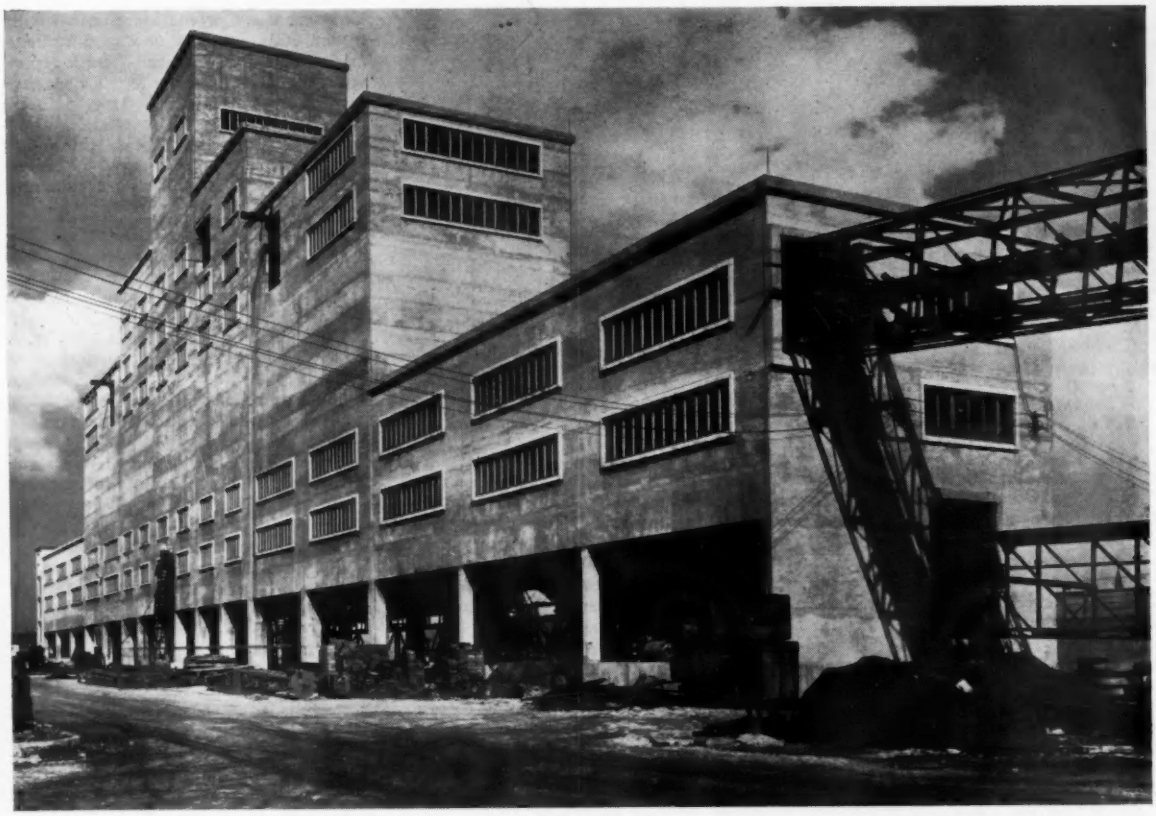
Two plants are being built, but only one is near completion. Each plant will have a throughput of 600 gal. of crude liquor per hour.

The plant is well instrumented and runs by automatic control from a central control room. The latest form of pneumatic control is employed throughout.

The buildings which house these two plants are both constructed of reinforced concrete, but whereas the plant now nearing completion has a roof of beam and slab design, the second plant has a roof of flat slab construction. A great deal of attention has been given to the



View of the reinforced concrete structure for carrying the coke stocking gantry. In the right background can be seen the coke screening plant.



The coke screening plant seen from the south east, nearing completion. The framework for the producer fuel conveyor can be seen at the bottom right hand corner.

surfacing of the roofs of these structures to avoid percolation by the various chemicals. The granolithic finish used consists of a sulphate resisting Portland cement, a chemical additive and granite chippings.

The solid products from this plant will be dehydrated by suitable means and bagged for export from the works, and the effluent liquor can now be disposed of to the municipal sewers.

Stores and Canteen

The stores building is situated on the west side of the works and adjoins the embankment on which the main sidings are laid out. From these sidings a track connects to the stores building via the tar loading bay, and rolling stock can be brought to the transit bay at the back of the stores.

The building itself is of shell roof construction, the span of the shell being approximately 47 ft. and comprises three shells 36 ft. wide. The height to the eaves of the shell being approximately 11 ft. 6 in.

In addition to the three bays there is a fourth bay of the same dimensions except that the height to the eaves is 23 ft. This is the transit bay with a travelling crane, which enables stores brought in by rail or road to be unloaded. The rail entrance to the building can be completely closed by roller shuttered doors. The floor area of the building is about 145 ft. by 55 ft.

Adjoining this building to the south, near the northern entrance to the retort house, is the shift workers' messroom and ablution block. This is a particularly conveniently placed building for its purpose and is well supplied to give the shift workers all possible amenities. Means are provided for them to make tea and warm up any meals they may have brought with them. It is of reinforced concrete construction, comprising a ground and first floor. The ground floor is occupied by the locker rooms, washroom and lavatories while on the first floor are the messrooms and the shift foreman's office. This building, like the stores adjoining, is heated by a low pressure hot water system, the calorifiers for the purpose being located in the basement.

Works Offices

The works are provided with well equipped workshops which are housed in a reinforced concrete shell roofed building 36 ft. wide by 120 ft. long. Included in this building is an annexe to accommodate the electricians and offices for the mechanical and electrical superintendents.

The details of construction of this building are similar to those for the stores. At the north-east corner of the works are to be found the main canteen and administrative offices. Both these are accommodated in one building which is in the form of a 'T.' The canteen running east and west and the works offices running north and south.

The canteen building includes ablution facilities and lockers for the day men as well as dining rooms and kitchens. In the administrative block are the works laboratories as well as the station engineer's and general offices.

The buildings are single storied and attractively coloured with a cream wash.

Looked at as a whole, the layout of this works takes full advantage of the 'green field' site to place buildings and plant in the most strategic and convenient positions. The design and appearance of all the buildings is of a high order and the planning behind the whole conception is clearly shown by the great attention to detail at every point. To achieve the objective of the manufacture of gas at the lowest possible cost, every possible means has been used to conserve heat wherever possible, and to install the most up-to-date handling plant to ensure that the two most costly items facing the gas industry today, fuel and labour, are both put to the best possible use.

The works might be summed up in one short phrase, 'one off.'

The contract for the construction of the carbonizing plant with the coal and coke handling plant was entrusted to West's Gas Improvement Co. Ltd. of Manchester, who had been called in at the very beginning by the United Kingdom Gas Co. The foundation work, including all piling and the building of the reinforced concrete coke storage bunkers, has been carried out by West's Piling and Construction Co. Ltd.

Abstract of a General Report Presented to the Fifth World Power Conference at Vienna

Economic and Technical Requirements for the Establishment and Operation of Long-Distance Gas Supply Systems

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SINCE the Fourth World Power Conference the increasing importance of gas as source of energy and as raw material has led to a rapid expansion of gas supply installations, in regard to both the throughput and the extent of the distribution systems. The United States of America are at the head of this development. In 1953 the mileage of the long-distance gas supply pipelines (excluding distribution mains and field pipes) reached 125,000 miles (201,168 km.), with a daily capacity of 660 mill. cu. m. (23,300 mill. cu.ft.) of natural gas. The heat of combustion of the natural gas satisfies 25% of the entire energy demand of the country (compared with 29.3% covered by solid fuels, 'The Italian Long Distance Natural Gas Transmission System'). Although the importance of gas distribution is growing more slowly in other continents, the beginnings of such a development are becoming evident also in Europe. In Italy the long-distance natural gas pipelines attained a length of 3,000 km. (1,860 miles) in 1954 and their capacity totals 20 mill. cu. m. (707 mill. cu.ft.) per day. The natural gas supply system of Italy satisfies 8% of the entire energy demand of the country (compared with 27% covered by solid fuels). These are figures the importance of which should not be underrated, since hitherto Italy was largely dependent on her solid fuel imports, while water power of any magnitude is available only in her northern provinces. The natural gas supply is therefore very important also from the point of view of the national economy. Finally, it must be mentioned that large natural gas reserves have also been found by boring in South-West France, at the northern edge of the Pyrenees. They supply a natural gas distribution system the long-distance pipelines of which reached about 550 km. (342 miles) in length in 1955, with an annual gas distribution capacity of 250 mill. cu. m. (8,830 mill. cu.ft.). Since new and considerable sources of gas have been found by boring at Lacq, it is proposed to extend the long-distance transmission system as far as the industrial area of Lyon and St. Etienne ('The Development of the Sources of Natural Gas in South-West France and Its Economic Repercussions').

Other Long-Distance Lines

In addition to these countries which, as far as can be deduced from the papers, are in the lead in regard to the distribution of natural gas, there are other places where long-distance gas pipelines have been installed and existing long-distance transmission systems further extended. Thus the following natural gas pipelines have been completed: a pipeline extending 348 miles (560 km.), from Sui to Karachi in West Pakistan, a pipeline extending 530 miles (853 km.) from Yelshanka, on the Volga, to Moscow, U.S.S.R., and another extending 1,100 miles (1,770 km.) from the Commodore Rivadavia field to Buenos Aires, Argentine. In 1951, a company in the United States of America worked out a plan for a long-distance natural gas pipeline to extend 2,500 miles (4,023 km.) from the Middle East oilfields as far as Paris, Western Europe, with a daily capacity of 1,000 mill. cu.ft. (28.3 mill. cu. m.). Even though the final stage of this scheme is far from being reached, the mere fact that such schemes are being prepared and discussed among experts demonstrates the trend of development.

Finally it should be mentioned that natural gas has been found by boring here in Austria also, hardly an hour's driving time from the conference headquarters. The fact that no paper has been submitted on this subject, as well as the fact that at present the natural gas resources are still not being utilized to an extent commensurate with their size—which would be desirable for the economy of this country—is due to the use of the natural gas fields and oil wells being withheld from the Austrian State until a year ago. However, it can be recorded that in the year 1955 160 mill. cu. m. (5,648 mill. cu.ft.) were used for the municipal gas supply system of Vienna, 232 mill. cu. m. (8,190 mill. cu.ft.) for the generation of electric power, and 223 mill. cu. m. (7,872 mill. cu.ft.) for various other purposes (mainly for industrial heating). It is intended to increase the use of natural gas approximately twofold in the very near future, and it is also intended to construct a long-distance pipeline to transport the gas to the south into the Styrian industrial area. Although the above-mentioned figures are very small compared with the utilization in other countries, the use of even these comparatively modest quantities of natural gas is very important for Austria, because this country has to cover by imports a considerable part of its fuel demand; this consideration may justify mentioning the fact at this point.

Reduction in Consumption

In countries which do not possess adequate natural gas resources, the construction of extensive gas distribution systems is generally proceeding with less vigour. The quantities of surplus gas, however, particularly of coke oven gas, available for long-distance supply to areas with appropriate demand, are increasing in the same measure as the rationalization of the heat economy of heavy industry, especially of steelworks and coke oven plants. In this connection, the considerable improvements which have been achieved in the heat economy of steelworks in the last years are significant, being illustrated by the very impressive reduction in fuel consumption per ton of raw steel.

The advances achieved in this field are largely a consequence of the proper application of blast-furnace gas. If, in the future the use of air blast enriched with oxygen is more generally adopted in blast-furnace practice, as appears likely, a blast-furnace gas with considerably higher calorific value will be obtained, and thereby a new and widely applicable kind of gas will be at the disposal of the Gasverbundgesellschaft (Integrated Gas Supply Company). Considering the fact that an average of 15% of the blast-furnace gas produced (and even considerably more in badly co-ordinated steelworks) is still burnt in flares, while the blast-furnace gas liberated per ton of raw steel represents a calorific value of approximately 3.6 mill. kcal., it is easy to realize the possibility of very great improvements.

The long-distance gas pipeline extending 380 miles (595 km.) from Lorraine to Paris and put into service some years ago demonstrates that great improvements can still be obtained by consistently adhering to the idea of rationalization to which the development of the long-distance gas economy of Western Germany is due. With regard to these questions of gas economy, much interest attaches to a paper recently submitted which reports favourable results and presents interesting suggestions. In countries which dispose of surplus gas from heavy industry as well as natural gas resources, the economics of gas supply are of particular interest. Paper 'Economic Basis for Long Distance Gas Transmission, Production and Utilization of Gas in Poland' indicates that extraordinarily economical solutions may be found in such cases.

Owing to the fact that the public gas supply undertakings are increasingly able to obtain both natural gas and rich gas from steelworks, these oragnizations can direct the centre of gravity of their activities to the task of gas distribution and this tendency will undoubtedly be of benefit for the consumers.

In this and other connections, efforts to drain firedamp from coal mines may have a certain interest. Finally, it may be worth mentioning that carbide manufacturers, using recently designed furnaces, are also in a position to supply a gas which is rich in carbon monoxide.

Underdeveloped Industry

Mineral oil refineries also frequently appear as suppliers of rich gas. It is very material for the importance of refineries as gas suppliers that in recent years the practice has been adopted more and more of transferring the processing of mineral oil from the oil producing countries, the industry of which is often underdeveloped, to the oil consuming countries. Finally, it may be mentioned that heavy chemical industry not only obtains gas as a raw material for the production of hydrogen for various kinds of high pressure synthesis (ammonia, methanol, isobutyl alcohol) and for the production of acetylene, ethylene and other organic substances, but frequently also delivers as by-products large quantities of residual gases, the calorific value of which corresponds to that of a rich gas.

Due to their varying calorific values and differing combustion characteristics, the direct feeding of these gases into existing gas supply systems is in most cases impossible. In recent years, however, methods have been developed whereby these gases are chemically processed in such a manner that they can be utilized for supply either directly or as components of suitable mixtures.

The motive for the integration of existing gas supply systems to larger units is frequently based on the fact that the demand of an existing system, having grown in the course of time, can no longer be covered by the available gas fields or production plants due to various causes—either the available gas fields are approaching exhaustion or for some reason the production plants cannot be expanded any more. One is then more or less compelled to obtain gas from more distant sources or plants and thus several gas supply systems become integrated into larger groups. There is at work a form of evolution which we have for a considerable time observed in a younger branch of public energy supply, viz., the electricity industry.

A further contribution to the present expansion of gas distribution systems undoubtedly emanated from the technical development and perfecting of the gasification process. This technical development, particularly the use of oxygen, the introduction of new and highly heat-resistant materials and the development of the fluidized bed method which was introduced into practice first by Winkler have made it possible to produce a rich gas from very low-grade fuels, from small coal and coal dust, from coal containing much stone and even from washery refuse. The successful results obtained in this field, particularly the processes for the total gasification of coal as well as the new processes for producing gas from oil are important. These methods have made the production of gas from coal independent of the availability of the ever diminishing supplies of coking coal as well as of the classical gas producer. Although most of the larger gas distribution systems are based on natural gas or coke oven gas, there has recently often appeared a tendency to increase the gas volume available for existing gas supply grids by the operation of gasification plants, whether it be to provide for the peak load or to increase the total volume of supply. For meeting the peak demand, particularly in small gas supply systems, recourse is had to carburization with liquefied gas, mostly propane, which is used for this purpose in continually increasing quantities in some European countries. Liquefied gas, which is often used for the operation of gas appliances independently of gas supply grids, not only competes with the public gas supply system but also finds useful application within such systems.

The advances in the field of rich gas production, particularly of the total gasification of low-grade fuels, are of great importance inasmuch as they provide the economic means to meet any threatened gas shortages which, during boom periods, are more or less inherent in gas supply systems which depend essentially on coke oven gas, that is on the utilization of a by-product.

Further, long-distance gas supply systems have also been constructed lately which are exclusively fed from gasification plants ('Construction of High Pressure Brown Coal Gas Pipe Line in Victoria') often using oxygen and in most cases erected in direct connection with the coal mines. The coal provided, which is frequently low-grade and occasionally consists only of the grades of particularly high ash content, is gasified at the pithead and the gas, sometimes produced under pressure, is supplied through long-distance pipelines to the consumption centres. In this way, coal stocks with particularly high ash content can be utilized for supplying gas to a large region and thereby often contribute to its economic development. Since it is very essential for gas supply over a long distance that the calorific value is as high as possible (because in this way the volume of gas to be transported is reduced) certain modern gasification processes are highly important.

In addition to these economic and technical aspects, which have made possible an expansion of the gas supply systems during the period of this report and will certainly render it possible also in the near future, an entirely new technical development is noticeable, the importance of which must not be underrated.

This is the transportation of liquefied and cooled gases ('Long Distance Gas Transmission—Economic and Technical Considerations'). The idea of transporting an inflammable gas like methane in the same manner as liquefied oxygen may first appear very risky. This stage of speculation has, however, long since been overcome. As experience has shown, such transportation cannot only be realized technically, but is also practically without danger. In the United States and also in European countries there are railway cars running in which cooled and liquefied ethylene is conveyed. Thus, the problem of transporting liquefied gas in a cooled condition is technically solved and we can therefore expect that the efforts which are being made by various authorities to ship liquefied methane in tankers from the Middle East oilfields to Europe will soon be put into effect. In this connection, it should be mentioned that certain hazards arising in railway transportation can be avoided with a tanker, because the ship can be equipped with a refrigerating plant which can maintain the necessary low temperature as long as desired. It will undoubtedly be of economic importance to find some use for the large quantity of cold which will be liberated when vaporizing the liquid methane at the place of delivery.

Co-operation Desirable

In this way, every seaport could become the starting point of a natural gas supply system. Realization of this proposal would bring the European countries into the same favourable position as the North American Continent in regard to natural gas supply, and it is unnecessary to detail the advantages which would accrue for the development of industry and the standard of living. This could doubtless be of benefit also to many regions the economy of which cannot at present be developed to an appropriate extent. It is very desirable that the co-operation of the European nations, which has already proved itself in many fields, may also in this case be rewarded by success.

The very high capital expenditure involved in the erection of long-distance gas pipelines explains the fact that several authors deal in great detail in their papers with the examination of the economic premises required to ensure the profitableness of long-distance gas pipelines (see papers 'Economic Requirements for the Establishment and Operation of Long Distance Gas Supply Systems,' 'Transmission of Gas in France,' and 'Long Distance Gas Transmission—Economic and Technical

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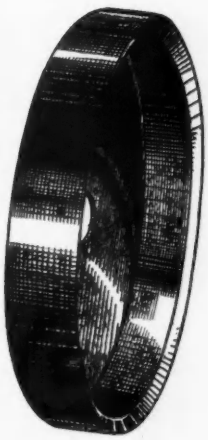

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Considerations'). In this connection, it is certainly not easy to transfer the experience and knowledge obtained in one country to another country. Differences in the economic systems of the countries concerned, in the organization of the utilities (public or private enterprise) and in the commercial, financial and technical conditions complicate a direct comparison. In spite of or just because of the differing economic circumstances, such a discussion of the question of earning capacity and of economic suitability will be very valuable for all those participating, for this discussion will enable them to become acquainted with new opinions and to re-examine their own point of view and it will thus have a stimulating and fruitful effect.

The primary economic requirement for the installation of a gas supply system or long-distance gas pipelines is, of course, the existence of an adequate market for the gas, both in regard to quality and quantity because only if the area which it is proposed to serve provides a market of sufficient size, will the large investment required to install a long-distance gas pipeline be justified. It is also essential that the market is located within reasonable distance of the sources of gas. Since the gas transmission costs depend, not only on the distance and the kind of ground to be traversed (additional costs due to difficult terrain, crossing of rivers and other structures, avoiding densely populated areas) but also on the calorific value of the gas (influencing the volume to be transported) and its specific gravity, these factors have also to be taken into consideration.

When analyzing the market, special attention should be paid to the seasonal and daily demand fluctuations of the prospective consumers. In this connection, a great many factors such as the climate of the area to be served, the nature and scope of the industries to be supplied, the domestic habits of the people and other circumstances have to be considered. It is naturally desirable that the period for depreciation of the long-distance pipelines (including compressor stations) should be as long as possible, and accordingly small daily and seasonal demand fluctuations are preferred. Opinions differ considerably as to the measure to be taken to attain a uniform load. In some undertakings, the view is taken that an attempt should be made to approach a load factor of one (100%) by including consumers whose supply can be interrupted if necessary. In other organizations, such a policy is considered wrong, because it compels comparatively large volumes of gas to be sold at a very low price and accordingly with little profit or even at a loss.

Central Storage Facilities

The efficiency of pipelines can be very substantially increased by the arrangement of storage facilities at the centre of the area of consumption. For storage for short periods and in cases where the comparatively large volume of the high-pressure system is insufficient, storage in pressure gasholders is particularly applicable. On the other hand, in the present state of technology, seasonal storage can be achieved exclusively in underground holders. This type of storage is, of course, dependent on the availability of certain geological conditions and, therefore, in many cases this favourable type of storage cannot be used. The supplementary production of rich gas to meet the peak loads has also been frequently suggested, but the general opinion seems to be that such an operation involves the gas supply in very high costs and consequently should be applied only in exceptional cases.

The geographical location of the market in relation to the source of gas must also be taken into account, since the routing of the long-distance pipeline will depend substantially on this factor. The routing not only varies with the terrain to be traversed but depends on whether additional consumers are situated along the line. Such consumers might not justify the installation of a separate long-distance pipeline, but their supply from the existing line might contribute considerably towards the earning capacity of the complete system.

When analyzing the market it is, of course, not merely necessary to evaluate the market in its present state. Long-distance gas pipelines represent large-scale investments requiring long depreciation periods. Hence, when considering the economic requirements, one must bear in mind also the future development of the market. Thus, detailed consideration must be given to future conditions. If the market is capable of sufficient growth, the economic optimum can frequently be achieved with a system which is utilized only partially in the first years, but which, in later years, meets the increased demand at a much lower cost than two small long-distance lines of less capacity. Estimates of future market demands are, by their very nature, among the most difficult economic investigations, since, in one way or another they involve some prediction of the future. In spite of all the uncertainty connected with this procedure, such forecasts cannot be dispensed with either in this or other branches of public energy supply, since inevitably large sums must be invested merely on the basis of long-term planning.

It may perhaps be of interest that even in countries where the superiority and necessity of free enterprise are generally accepted as fundamental, the government retains a certain say in this field of public energy supply. It is worth mentioning here that in the United States of America projects for new long-distance gas pipelines must be submitted for approval to a federal authority, together with evidence of the availability of an adequate gas supply for approximately 20 years and of a survey of the requirements of the market to be supplied. In the United States of America it is held that this requirement not only serves the interest of consumers but also indicates the soundness and economic suitability of the system to be installed, thus facilitating its financing.

Gas Supply in Competition with Other Fuels

When introducing a long-distance gas supply system, careful consideration should be given to competition with other fuels which will in part be displaced by the availability of gas. It is very difficult to generalize as to how this problem should be dealt with, and widely different views will be held in different countries. It should here be stressed, however, that first place should always be given to considerations of national economy, since it is certain that damage done to one branch of industry by another will always have a harmful effect upon the entire economy of the country. Above all, any dislocation should be avoided during the transition period. The relationship of the price per thermal unit of the gas to that of the other fuels is, of course, very important for competition. In the United States and Italy natural gas is comparatively inexpensive and finds, therefore, very wide application. Consequently, natural gas has played a considerable part in reducing the proportion of solid fuels used. In Italy, which is a full-importing country, such a development may be very desirable in regard to foreign trade.

In countries in which the gas distribution systems are not based on natural gas, it is *a priori* necessary to regard the gas as a precious fuel and to value it so highly that it cannot compete with solid fuels or fuel oil on the basis of the price per thermal unit. In this case, gas can be applied only for such purposes as can tolerate a higher price per thermal unit; but it can be shown that even so the gas supply has a very fruitful effect on economic development. This applies under certain circumstances also to the distribution of natural gas as, for example, in France. In spite of a price per thermal unit higher than that of solid fuels or fuel oil, an extensive natural gas supply system could be established there, because the gas is used only where its high price is tolerable and because it is extensively used as raw material for the chemical industry. That such a price policy for the use of natural gas is by no means prohibitive but represents a perfectly practical and in special cases the correct procedure, is demonstrated by the fact that an extensive expansion of the distribution system of South-West France is planned on the basis of sources of gas recently found by boring.

Construction Costs for Long-distance Gas Pipelines

When estimating the construction costs, apart from the economic factors discussed above, it is necessary to start with a more or less detailed technical project. The first duty of the design engineer is to determine the pipeline diameter and operating pressure for the maximum gas volume to be transported (which in a given case will represent the demand to be realized in a few years). The most economic solution can be found by calculation alone, if it is based on the construction costs of the pipeline as a function of the diameter, on the gas compression costs as a function of the pressure and on a formula for the drop in pressure in the pipeline.

In this connection, attention should be drawn to the fact that the different equations mentioned and used in the literature give significantly differing values. It would be desirable, not only from a purely technical point of view but also in order to place the planning of long-distance pipelines on a secure

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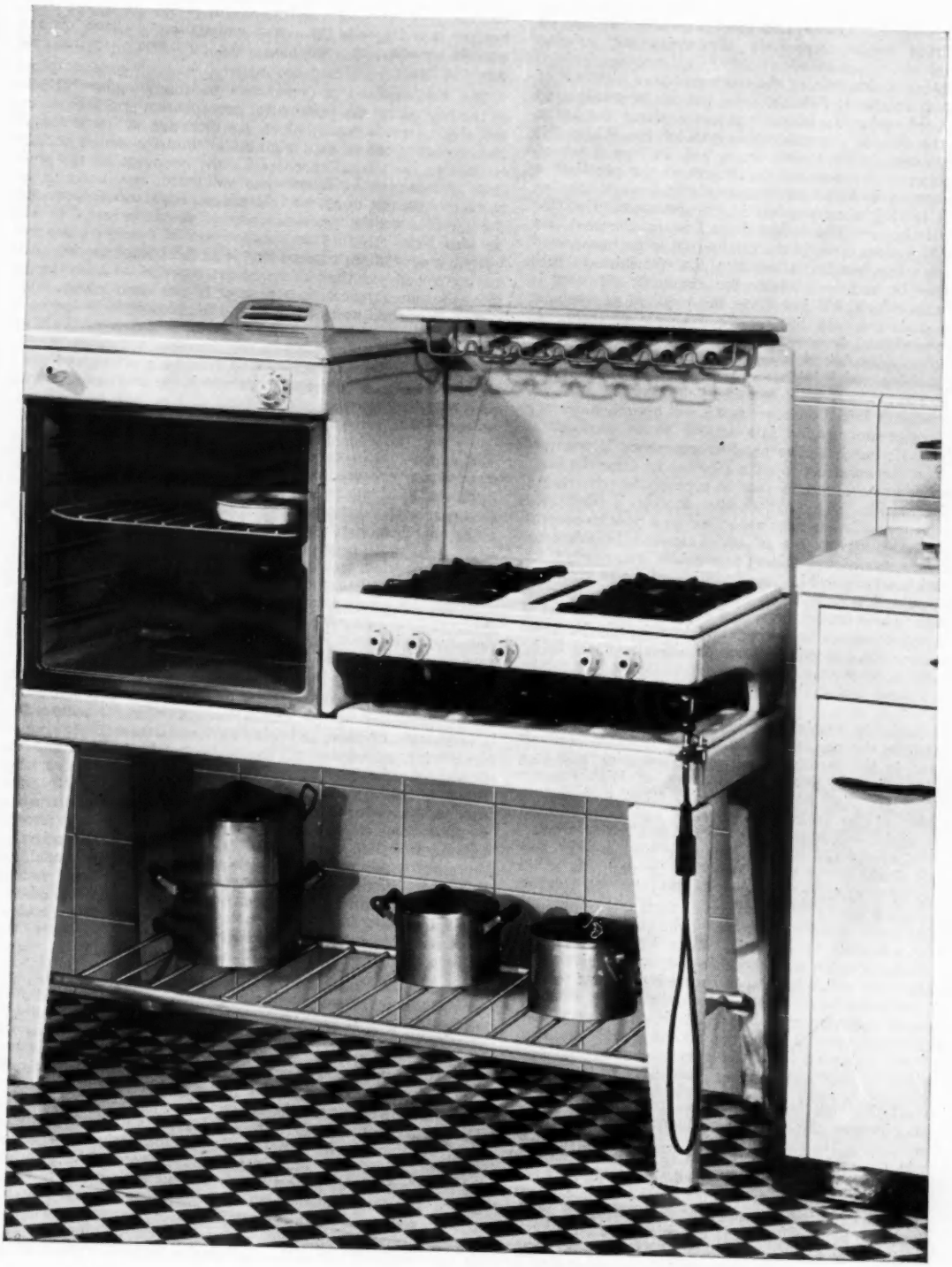

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foundation, that collaboration between the qualified experts on a broad basis might succeed in eliminating the existing discrepancies.

The problem of determining the most economic diameter of the pipeline is somewhat different if the gas can be transported from the field under its inherent pressure along the entire length of the line or a considerable part of it. While this case hardly occurs in the United States with its long distances, because owing to the considerable length of the pipelines a large number of intermediate compressor stations has to be installed, it is very often possible in European countries (for instance in Italy, see 'The Italian Long Distance Natural Gas Transmission System'), where the gas has not to be transported farther than a few hundred kilometres, that the inherent field pressure may be sufficient. Here the economic diameter is obviously that which will just allow the required gas volume to be forced through the line by the available pressure. It must be remembered, however, that the field pressure falls off in the course of exploitation. If an inexpensive pipeline is selected, requiring a high initial pressure, then the moment will not be far away when the decreasing field pressure will fall below the requisite initial pressure, and it will become necessary to put a compressor station into service or to construct a second line. If, on the other hand, more money is spent at the outset on the construction of a pipeline of large diameter which also contains a certain reserve capacity for covering a possible increase in demand, then the moment is postponed when the gas transmission costs are raised by a new investment (or, alternatively, by the use of compressors). In this case, since there are several new factors to consider, it is much more difficult and hardly possible by calculation alone to arrive at the most economical solution.

A problem which cannot be solved by mere calculation, but only with the engineer's experience and intuition, is the question of routing the line with respect to difficult terrain to be traversed, the arrangement of compressor stations and the provision for future growth in demand by suitable planning in advance.

In this connection, special attention is drawn to the fact that, as illustrated in the papers submitted, very different methods are followed in the various countries for designing and constructing long-distance lines ('Construction of High Pressure Brown Coal Gas Pipe Line in Victoria,' 'The Italian Long Distance Natural Gas Transmission System,' and 'Long Distance Gas Transmission—Economic and Technical Considerations'), methods which also substantially influence the earning capacity of the pipelines. It would therefore be desirable if the interchange of experience rendered possible by the present conference could lead to the discussion of these questions, since in this way some technical advance might perhaps be made towards the adoption by countries where hitherto expensive methods of construction have been in use, of technical solutions and methods which have been shown by another country to permit an inexpensive constructional technique. Such an interchange of experience could result in great economic advantages.

Financing

In view of the high investment costs required for long-distance gas pipelines, the question of financing is naturally of special importance. The methods of financing differ very much, of course, in the various countries. They appear to have in common that the undertakings which administer the gas supply systems finance a very considerable portion of the investments by loans. From the viewpoint of the gas supply undertaking, the choice between different financing methods will be made primarily after due consideration of capital costs, since the capital costs are an essential factor in the calculation of the earning capacity of the gas supply systems. With regard to the question of depreciation, widely differing views are held in the various countries. This may be partially due, on the one hand, to local condition, and on the other, to the difficulty of making a reliable calculation of the life of technical installations. Normally the life of high pressure gas pipelines can be considered to be very high. The experience of the Ruhrgas A. G., shows, for instance, that installations which have been in service for 40 years are still operating perfectly, although the local conditions in the Ruhr district as well as the fact that coke-oven gas is distributed require increased maintenance of the pipeline because of corrosion. In many cases, of course, the taxation laws also influence the policy of depreciation, because it is naturally the aim of undertakings to keep low any taxable profit by applying the maximum permissible depreciation.

The total expenses of operating a gas supply system include, in the first place, the portion for amortization and interest on the original investments, which are reckoned as fixed charges and are calculated on an annual basis. But the portion of costs containing the annual expenses for the operation of the pipelines and compressor stations, as well as for repair work, and the corresponding portion of the general expenses of the undertaking, also consist predominantly of fixed charges. It will be seen from this that the annual cost of operation depends only to a very minor extent—that is as far as compression costs are concerned—on the volume of gas supplied. Consequently, the same annual costs are practically the same whether the system is utilized well or badly, and the transmission cost on a unit volume basis is therefore about inversely proportional to the load factor. The load factor therefore represents a very vital figure in the economics of operating a pipeline, and every effort will be made to keep it high within the limits of economic practicability.

Technical Problems

The fact that in various countries very different methods of construction are used may be due to a certain extent to the particular local conditions which find expression in the different constructional practices, standards and specifications of the authorities and trade associations. At the same time, however, these differences may mostly be traced back to the fact that technical development has not yet come to an end. This applies not only to purely technical factors, such as the pressure to be selected, the arrangement of compressor stations in the long-distance lines and other problems, but marked differences also appear, for instance, in the views on the factors of safety to be introduced into calculations of the strength of pipelines.

It is to be hoped that the opportunity for an international discussion of all these questions before such a qualified forum as is represented by the World Power Conference will lead to a unification of ideas and so to a technical advantage. In particular the calculation of the strength of pipelines and the factors of safety to be adopted have an economic importance which is not to be underrated, because they materially affect the gas transmission costs. A standardization of construction methods for long-distance gas pipelines will naturally also be very useful when such systems extend beyond the frontiers of individual countries. Several beginnings of international co-operation in this field of European power economy are in hand. A unification of views on suitable construction methods, combined with the standardization of the respective specifications issued by the State and by trade associations, and of the corresponding standards, will undoubtedly facilitate international co-operation in this field.

Concerning the construction of transmission pipelines, opinion is unanimous that only steel pipes with welded joints should be considered. But with regard to the type of welded joint, opinions differ widely. In some countries butt-welding is preferred, in others socket and spigot-welding, owing to the difficulty of keeping the pipe dimensions within very narrow tolerance limits. Since certain designs of sockets and spigots also allow the pipeline to be adapted to the terrain in a comparatively simple manner, the application of socket and spigot-welding undoubtedly offers certain advantages. The inclusion of flexible joints is generally not considered necessary, except where very substantial earth movements may occur in the terrain concerned (mining areas are, of course, an extreme example of such conditions). Very different opinions are held about dimensioning pipelines in relation to their strength. While in some countries an extremely careful and conservative view is taken, as far as the dimensioning of pipelines is concerned, in other countries it is believed that high factors of safety may to a large extent be dispensed with, and experience seems to justify the latter opinion. In this connection a great deal of valuable information has been made available, particularly in one paper dealing with the calculations for pipelines as thick-walled containers; the dimensioning is such as to avoid any movement of the internal elements of the pipe at the maximum pressure occuring in the pipeline (in most cases test pressure). In the author's opinion a very small safety factor is sufficient, if this item is calculated exactly. Naturally, the

quality of the steel to be used will have an influence on these questions, and it may be expected that improvements in steel technology will make possible certain further advances. Great importance has always been placed on the testing of welded joints in long-distance pipeline construction. Now that the peaceful application of atomic energy makes available highly radioactive preparations, the penetration of welded joints by radiation can be effected very rapidly and cheaply, and this method is therefore used also for day-to-day checking of welded joints at site.

The selection of means of protection for long-distance transmission systems shows a certain amount of variety. This is due to some extent to the difference between coke-oven gas and natural gas. Coke oven gas is particularly liable to cause corrosion and dust deposits, and hence it is necessary to use special methods of construction which are capable of standing up to these conditions. Where there is danger of corrosion of the pipeline, the practice has frequently been adopted of checking the thickness of the wall by means of a radioactive method. In this case, for instance, the radiation intensity emanating from a mesothorium preparation is measured with a Geiger counter after passing through the pipe wall and from this the thickness of the wall is calculated. Further special optical instruments are very important for observing and recording photographically the appearance of the inner wall of the pipe while the line is in service. Particular attention should be paid to the protection of steel pipes against corrosion. It has become common practice to use as carrier for the insulating compound, which consists of bitumen or corresponding substances from the distillation of bituminous coal, woven glass fibre or asbestos fibre, since these products are substantially more durable than the textile materials previously used. During the transportation of pipes to the site and during their assembly, the insulation is often subject to damage which cannot be avoided. It has been found very useful to check the insulating layer electrically immediately after the pipe has been laid whereby defective places can be detected. Insulation of pipelines is not, however, sufficient by itself to prevent corrosion damage. Pipelines are therefore cathodically protected, and, when routing the line, areas should be avoided in which corrosive soils might be expected. It is also very helpful to increase the longitudinal resistance of pipelines by incorporating insulating flanges. In spite of all efforts, the problem of pipeline corrosion cannot be considered as solved, particularly because with the present type of insulation, local faults may result in a very rapid attack by corrosion (pitting). It may perhaps be hoped that development in the field of plastics will dispel some further troubles, either by finding better insulating materials or by success in developing corrosion-resistant pipelines made from plastics based on the polyethylene group.

Lowering Investment Costs

Attempts are being made to lower the investment costs of long-distance gas compressors by increasing their speed of rotation. It is in line with this development that the trend is from piston compressors to rotary compressors. Propellor blowers having a speed of from 6,000 to 18,000 r.p.m., recently developed in Germany, may perhaps represent the limit of what is at present attainable. It may be that, in the near future, turbo-compressors will be used as intermediate compressors for long-distance gas supply systems of very large capacity. These compressors, driven by gas turbines, should represent the most economic solution and make the long-distance gas pipeline independent of other energy supply systems.

Of greater importance is the metering of gas, which represents the basis for accounting. Besides gas meters of the conventional type, flow meters have also been designed involving the throttle principle which achieve a very high range of measurement by automatically matching the orifice of the measuring throttle to the volume of flow. The instrument works in such a manner as to maintain a constant pressure drop by varying the cross-section of the flow passage, the cross-section of the throttle being transmitted to the indicating or recording instrument.

Gas metering instruments are subject to special requirements owing to the trend to sell gas according to tariffs composed of a basic price (calculated from the maximum consumption) and of an operating price, which is proportional to the volume actually consumed. The introduction of such tariffs, which are already regular practice in the electric power supply industry, necessitates, of course, the development of entirely new gas metering instruments. In the same measure as gas supply systems are growing, problems are arising in the technique of measurement and technical control. The orderly operation of large gas networks can generally be realized only if the plant is controlled from the central point having available not only adequate means of communication, but also facilities for distant measurement and remote control. This development also is following lines parallel to those of the electric power industry. The gas supply undertakings, which are frequently only the distributors of the gas, also have the greatest interest in specifying the quality of the gas, so that agreements reached on this subject become part of the gas supply contract.

It would be desirable if the many interesting proposals in paper 'The Technical Specifications Used in Contracts of Purchase and Sale by Gaz de France of Large Volumes of Gas to Pipe Line Companies and Distributors' could lead to an international agreement on specifying the quality of natural gas and coke oven gas, since such standardization would undoubtedly promote and facilitate the international exchange of gas.

B.C.U.R.A. ANNUAL REPORT

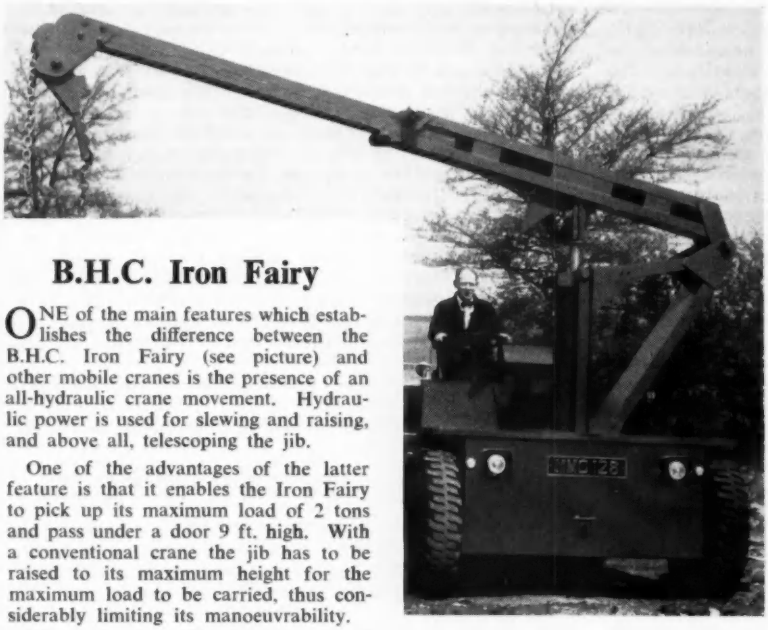
THE annual report of the British Coal Utilization Research Association, which has just been published, reviews the activities and the trends of investigations that are proceeding in the Association's Research Laboratories at Leatherhead. The main investigation on boiler firing has been research into design considerations for the use of inferior coal on a chain grate in a locomotive boiler using for the experiments a Royal Scot type boiler lent by the British Transport Commission. Cyclone combustion by which the majority of ash is discharged as slag has been investigated with a view to formulating design data. The performance, it seems, is effected mainly by the flow characteristics of the slag while the mineral content of the fuel is relatively unimportant.

The need to improve the efficiency of domestic heating must now be related to the need to reduce air pollution. The free-standing open fire developed by the Association enables coal and coke to be burnt more efficiently, thus reducing fuel consumption. Further information has been obtained on the design and installation of central heating systems based on forced circulation of hot water through small bore pipes, and further investigation is proceeding, which points to the necessity of developing automatic controls.

Members of the Association have shown more interest and given increased support to investigations into gas producer practice. Most of the work, however, would apply more to the steel industry than the gas industry since coal was used as the fuel, but the work done on the relationship between gas quality and the resultant flames will be of interest. For this purpose two small furnaces were designed and built in which preheated gas and air are burned in a 5 in. internal diameter by 30 in. long combustion chamber. Overall and local heat releases are then measured. Among the tests carried out was one on producer gas preheated to 1,200°C. in a refractory recuperator.

In response to the demand for a means of continuously recording producer gas quality tests have been made on two proprietary instruments. Both were satisfactory but proved the need of a proper means of cleaning the gas and an investigation on the design of a filter showed that a closely packed renewable cartridge type filter was satisfactory. Other investigations included research into coal treatment and the physics and chemistry of coal. Under these headings such subjects as the solvent extraction of coal with coal tar oils, the mathematical analysis of coal breakage, and the grindability of coal were dealt with. Work has also been done on the physical structure of coals, the production of adsorptive charcoals, and the coking mechanism. A section of the report is given over to published papers by members of the staff and is divided up under subject headings. It is particularly interesting for anyone working in the gas industry who may find himself confronted by many of the problems discussed in the papers.

TRADE NEWS SUPPLEMENT



B.H.C. Iron Fairy

ONE of the main features which establishes the difference between the B.H.C. Iron Fairy (see picture) and other mobile cranes is the presence of an all-hydraulic crane movement. Hydraulic power is used for slewing and raising, and above all, telescoping the jib.

One of the advantages of the latter feature is that it enables the Iron Fairy to pick up its maximum load of 2 tons and pass under a door 9 ft. high. With a conventional crane the jib has to be raised to its maximum height for the maximum load to be carried, thus considerably limiting its manoeuvrability.

The ease and precision of crane control as afforded by hydraulic power transmission is known generally but in the B.H.C. Iron Fairy this has been carried to an even further stage. An additional master control is incorporated in the hoist motion so that the heaviest loads can be lowered at a speed almost imperceptible to the eye.

Driver is Stationary

Turning to the chassis the driver is stationary and the jib slews, thus affording greater all-round visibility, which is a most important point if the crane is to work in confined gangways, etc. Another important feature is the employment of automotive controls so that any person who can drive a car can drive an Iron Fairy.

The crane was expressly designed to deal with those lifting and shifting jobs where the distance travelled is high in relation to the vertical lift. Loaded, it can travel at 5 to 10 m.p.h and unloaded will reach 30 m.p.h. The equipment makes it eminently suited for road travel.

For handling lengthy objects such as timber, cast iron or steel pipes the Iron Fairy is ideal, because such a load can be slewed round lengthwise beside the driver and enable the crane and load to pass a doorway 7 ft. 4 in. wide.

For general industrial loading or unloading of lorries where the lift is relatively small the Iron Fairy again scores because of its high travelling speed, and its ability to negotiate restricted gangways. Its telescoping jib enables the load to be placed in positions impossible for any other machine so that it can go straight into the stores or machine shop. —*British Hoist and Crane Co., Compton, Berks.*

Sigma Spot Welding

The latest addition to the range of Quasi-Arc Sigma equipment is the spot welder which combines the reliability of the Sigma process with the high production speed of spot welding.

Mild steel, stainless steel and copper based alloys can be spot or plug welded up to ¼ in. in thickness, and as the weld area is shielded by inert gas, the weld is free from oxide inclusion and has a smooth and clean surface.

Once the controls are set for the required conditions the process is automatically controlled. The operator merely positions the torch over the joint, presses the trigger, and in two to five seconds the weld is complete and the torch is ready for the next weld.

One Side Only

Welding is from one side only, thus avoiding difficulties where access from both sides is impossible, and no forging pressure is required. Filler wire is automatically fed into the weld pool and controlled so that the 'sink holes,' which are common with other spot welding methods, are eliminated.

High production rates of up to 20 spot welds per minute, including positioning and post-weld shielding, and high quality welds with minimum finishing keep costs down and make the process very economical.

In addition, the Sigma spot welder can be converted in a matter of seconds from spot to seam welding, making it a very flexible and useful piece of equipment for any fabrication shop.—*Quasi-Arc Ltd., Bilston, Staffordshire.*

Heatinaire System

The Heatinaire system of central heating by ducted air is an unrivalled step ahead in the modern trend towards smokeless, trouble-free, constant and controlled heating and ventilation of entire premises from one unit.

That Heatinaire operates in a neat unit (see picture below) and is the result of much original thought on the part of an experienced developments staff, the ingenuity of the designers, and advanced research in conjunction with technicians of the East Midlands Gas Board.

A thermostat is fitted as standard and there is a damper control in each room and temperatures can be varied according to requirements without the use of additional thermostats.

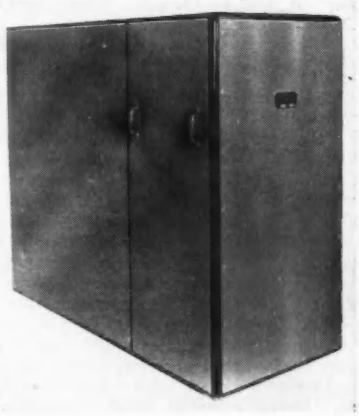
The heat exchanger has been very carefully designed to give rapid heat transfer with the maximum efficiency, thereby ensuring the utmost economy in the consumption of gas.

Clean Air Circulated

Two air-cleaning filters are incorporated in the unit, so that only clean filtered air is circulated. The fan unit is designed to give a complete air change every four to five minutes.

During the summer months, the premises can be air-conditioned by using the fan unit only, without the heating system being brought into operation.

When heating is required, the unit is brought into immediate operation by lighting the gas burner, which then continues operating until no longer required. Thus Heatinaire can be lit in the autumn, taken for granted all through the winter and turned out with the return of warmer weather. For 'snap' unseasonable chilly days, it is ready for immediate use.



Once installed, whether in a new building or as a conversion, Heatinaire will give a long period of attention-free service, as has been proved by actual use of these units over an extended trial period. It can be confidently installed in any area, as it is completely smoke free and ideal in the development of smokeless zones.—*G. H. Coy (Engineers) Ltd., Risley, Derbyshire.*

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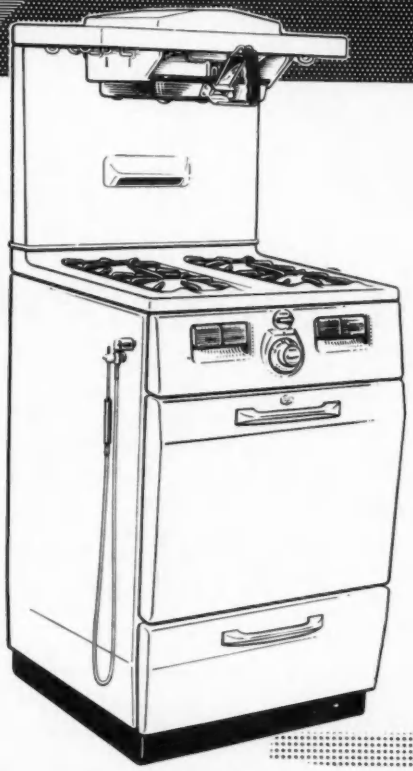

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C96

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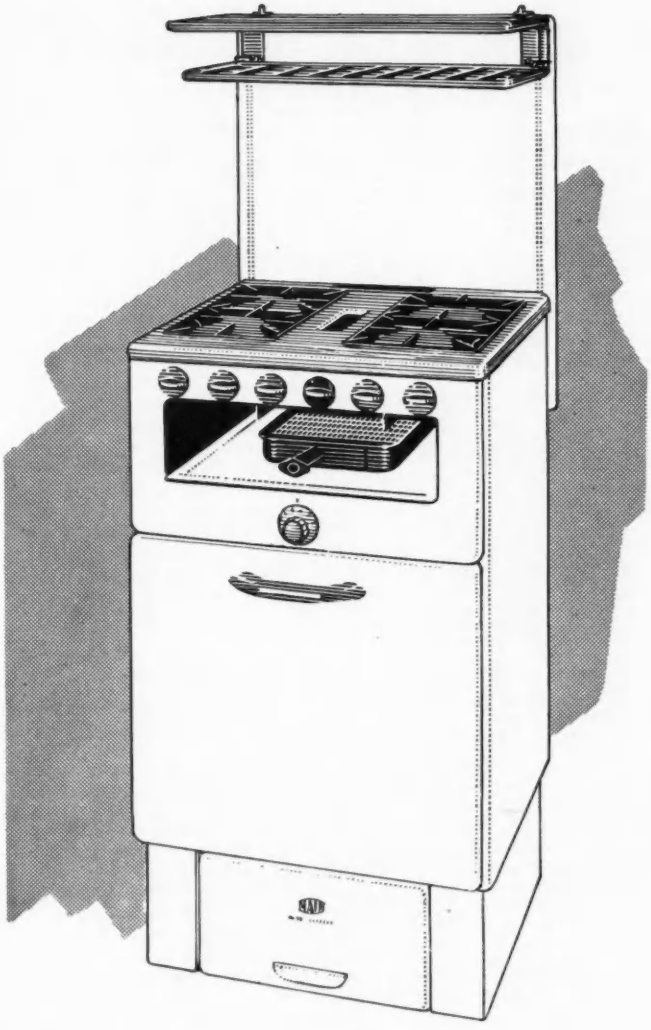

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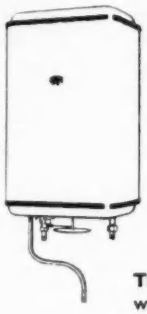

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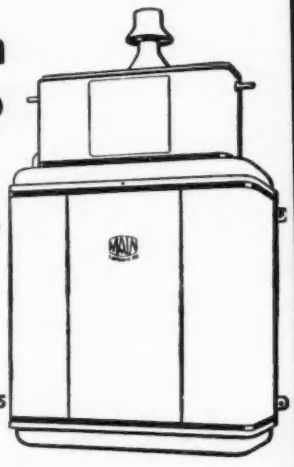

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W32

Protective Paint

—Exceptional protection against the corrosive action of acids, alkalis and industrial gases is provided by Supruba chlorinated rubber paint. Chlorinated rubber being insoluble in water, Supruba paint possesses marked impermeability to water and water vapour.

In addition, the dried film is non-toxic, non-inflammable and a good electrical insulator. It possesses excellent heat-resisting qualities and can withstand a temperature of over 270°F. before decomposition of the film occurs.

Supruba chlorinated rubber paint is formulated to withstand even the severe atmospheric condtions prevailing in gas-works, and has been used successfully on steelwork and woodwork in a number of gas undertakings.

Particularly Valuable

For preservation of chemical and processing plant, for the protection of machinery, for general factory maintenance purposes, and for use wherever the atmosphere is heavily charged with industrial fumes and gases, Supruba is proving particularly valuable.

As with other paints, rust inhibiting primer must be applied beforehand, but undercoating is not essential. A primer and two coats of Supruba chlorinated rubber paint produce a highly satisfactory finish. Primer of the red lead or zinc chromate type is recommended.

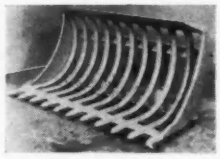
Supruba chlorinated rubber paint can be applied to the following surfaces after correct priming has been carried out: All types of metal, wood, plaster, asbestos, hardboard, cement, and brickwork. It is available in 16 shades, providing full scope for 3-dimensional colour schemes and is also supplied in red oxide. Application is by brush or spray, although the rapid drying rate makes brush application a little more difficult than with an oil or a synthetic paint.—*Supra Chemicals and Paints Ltd., Hainge Road, Tividale, Tipton, Staffs.*

Chaseside Attachments

Three new attachments for the Chaseside Loadmaster hydraulic shovels are now available. Two which will find use with every type of user are the Crane Hook and Bulldozer Blade. Both these items can be fitted to the scoop in a matter of minutes by securing fixing clamps.

The Crane Hook enables the Loadmaster to be used as a crane with efficiency and safety and in a manner that cannot be approached by make-shift methods. The Bulldozer Blade is invaluable for light bulldozing and innumerable other jobs.

The third attachment, the Rock Scoop, has a more specialised use for those who need to shovel clean rock or rubble. Constructed from heavy steel tube with Stellite tipped points to give good wearing qualities the scoop allows dirt and small stuff in the load to fall between the bars leaving a clean load. This item should be of considerable interest to such users as quarries demolition contractors and brickworks. —*Chaseside Engineering Co., Ltd., Station Works Plant, Hertford, Herts.*



One Yard Dumper

The Trusty one yard dumper is designed to be handled in soft ground by omission of a differential. It is fitted with an AVA1 Petters diesel engine, and a three speed and reverse gearbox providing 3, 6 and 10 m.p.h. forward and 2½ m.p.h. reverse speeds.

Heavy type steering and chains are standard to all Trusty dumpers.

The skip capacity is 1 yd. with a loading height of 3 ft. 8 in. with a hand trip for tipping. Independent wheel clutches are provided for sharp turning and a drawbar is fitted at rear for towing other equipment.

The dimensions of this machine are: Length, 8 ft. 6 in.; width, 5 ft. 1 in.; height, 5 ft. 6 in.; turning radius, 10 ft. 6 in.

The weight of the skip and pay load is also on the driving wheels (600 x 22) ensuring best traction under all conditions. The large size tyres are: Rear 600 x 16; front 600 x 22; ground clearance is 12½ in.

The machine is designed to carry 1 yard (up to 30 cwt.) over soft unmade ground, such as building and road work sites, etc. The low forward and reverse speeds and wide wheel base coupled with the rear wheel steering makes the dumper safe and simple to control.

High Lift Shovel

The Trusty hydraulic shovel, which will work extremely well in confined spaces and is economical in use, is fitted with a high speed 600 c.c. 6-14 h.p. petrol engine, air cooled, three speeds forward and reverse. Adjustable width wheels.

Hydraulic power is by pumps through controls to two ample rams, the shovel is available with high or low lift.

The drive throughout is by chain, no differential is used, rear wheels are controlled by dog clutches providing four-wheel steering. For sharp turning either rear wheel can be held by individual brakes.

Height of lift (to pivot) is 7 ft. 6 in.; height of lift (clearance to bottom of skip when tipped), 5 ft. 4½ in.; lifting capacity (maximum), 5 cwt.; overall length, 13 ft. 0 in.; overall height, 5 ft. 0 in.; overall width, 4 ft. 3½ in.; turning radius, 11 ft. 3 in.; skip capacity, 7½ cu.ft.; travelling speeds, 2 to 8 m.p.h.

Road Roller

The unique simply designed Trusty road or path roller offers easy maintenance, extremely low running costs. It is fitted with rear rolls of 36 ft. diam. x 10 in. wide (fitted with scrapers) and front roller of 30 in. diam x 20 in. wide (in two halves; also fitted with scrapers, if necessary).

The rolling width is 39 in. and the roller centres are 46 in. The machine operates at approximately 1 m.p.h. in both forward and reverse gears whilst additional forward speeds of 2 and 3 m.p.h. are provided.

Rack steering and spraying attachment are supplied if desired. Weight dry is 16 cwt.—with water ballast, 21/25 cwt.—*Tractors (London) Ltd., The White House, Bentley Heath, Barnet.*

TEANTEE PRECISION SACK PLACER

Although in recent years there have been many improvements in mechanical handling equipment it is seldom that anything really new comes to light. The introduction of the TeanTee precision sack placer is one of those occasions when a genuine advance in handling technique can be recorded, and no concern which has to load large quantities of bagged material can afford to ignore this development.

The sack placer is intended to bring 1-cwt. paper bags or similar containers almost to the exact position at which they will lie on the road vehicle so that the loader has only to exert the bare minimum of manual effort required to put the bag close up to its neighbours and the right way round.

The starting and stopping of the conveyor belts and their raising and lowering are controlled by a simple panel at the finger tips of the man doing the loading.

It has been found in practice that one man is able to place sacks neatly in the vehicle at a rate of 1,000 per hour or even more under favourable conditions. The amount of movement available at the discharge end of the conveyor system is such that a normal open vehicle can be completely covered—in the case of very long vehicles or trailers it may be necessary to draw up once during the loading process.

The man employed as loader is normally a specialist doing nothing else as obviously a certain amount of practice and dexterity is needed to obtain the fullest advantage from the loading plant.

Installation is extremely simple a small circular pit about 3 ft. deep being required underneath the hydraulic ram, while apart from this the plant is simply bolted down to the floor and normal 3-phase alternating current to the extent of 3 h.p. only is required to run the entire plant.—*T. & T. Works, Ltd., Billesdon, Leicester.*

Wellman-Galusha Gas Producers

A battery of seven 10′ 0″ diameter Wellman-Galusha Gas Producers, for gasifying Natal anthracite coal—under construction at Vereeniging, Transvaal, South Africa. The installation is one of the most extensive gas producer plants to be erected initially as one battery in the British Commonwealth.

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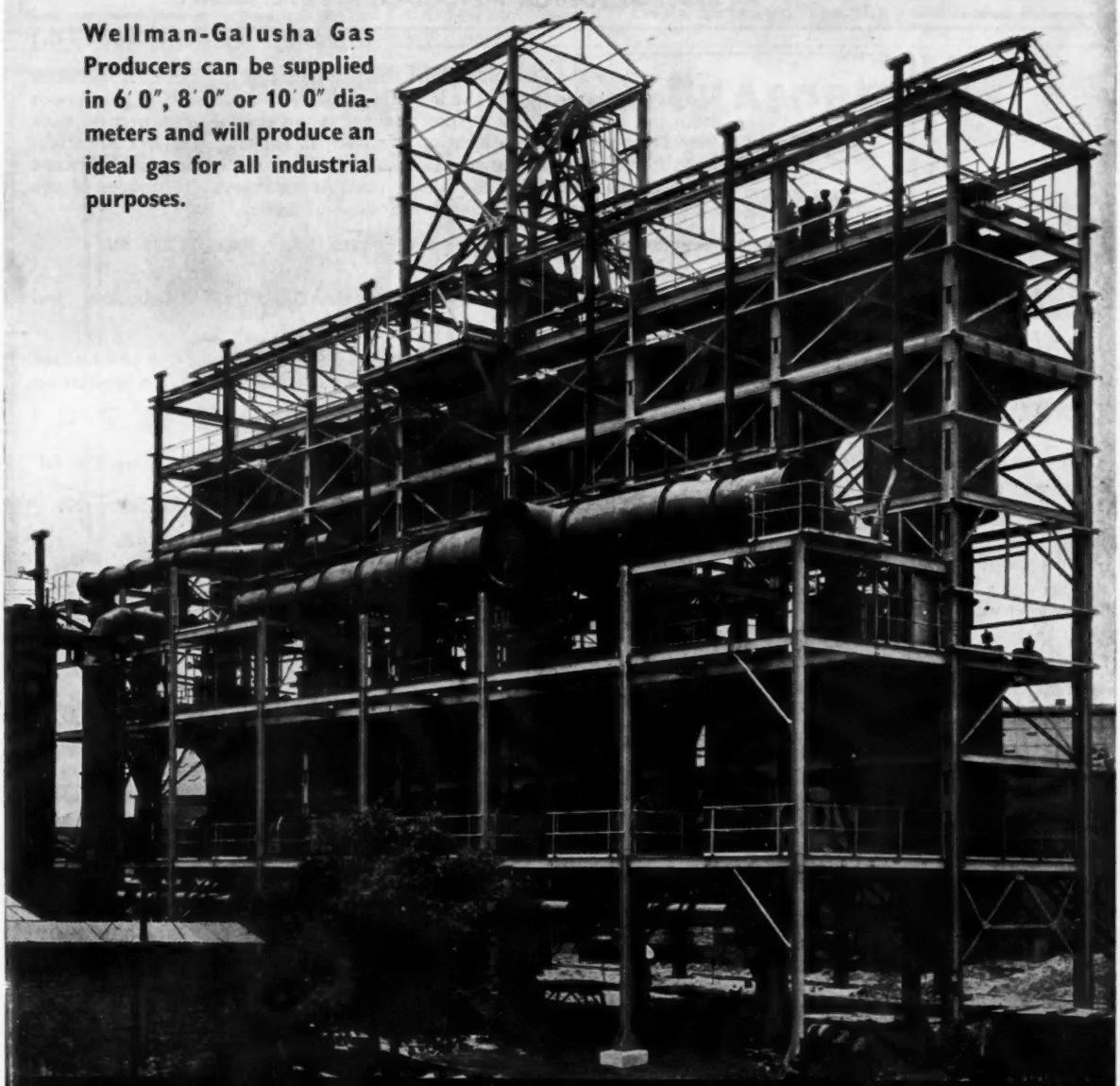

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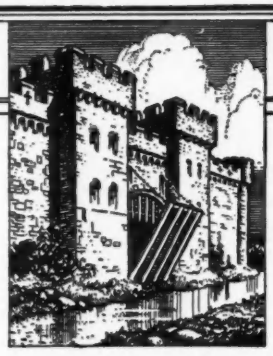
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APPOINTMENTS VACANT

ASSISTANT SECRETARY (Male) required immediately by Trade Association connected with the coal tar industry. Office control, accounts, membership, statistics, trade journal, etc. Commencing salary about £700 p.a. according to experience and ability. Optional 5 per cent. contributory Pension Scheme. Apply by confidential letter to the Secretary, B.R.T.A., 9, Harley Street, London, W.1.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
APPOINTMENT OF GASFITTING FOREMAN, SCUNTHORPE GROUP

APPLICATIONS are invited for the position of GASFITTING FOREMAN in the Scunthorpe Group. Applicants must possess a City and Guilds First Class Gasfitter's Certificate.

The salary payable will be within Grade A.P.T. 4a of the National Salary Scales for Gas Staffs (£535/£615) according to experience. A modern house can probably be made available.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, experience and present position together with the names of two referees should be addressed to the Group Manager, East Midlands Gas Board, Dawes Lane, Scunthorpe, Lincolnshire, to arrive not later than July 31, 1956.

BERNARD CLARKE,
Divisional General Manager.

Lincoln.
July 16, 1956.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
SHOWROOM SUPERINTENDENT—NORTHAMPTON GROUP

APPLICATIONS are invited from suitably qualified persons for the position of Showroom Superintendent, Northampton. The appointment will be made in Grade APT. 8 (salary range £710/790) and the commencing salary will be in accordance with the experience and qualifications of the person appointed.

Applicants must have had considerable experience of Showroom supervision, appliance sales and consumer service and, especially, be well versed in window and general display practice.

The position is pensionable, and the successful applicant will be required to pass a medical examination.

Applications stating age and giving details of education, qualifications and experience, together with the names of two referees, should be addressed to reach Mr. E. B. Craddock, Group Manager, 45, Abington Street, Northampton, not later than Wednesday, August 15, 1956.

H. B. TAYLOR,
Divisional General Manager.

Leicester,
July 16, 1956.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
NORTHAMPTON GROUP
VACANCY FOR WORKING GASFITTING FOREMAN—WOLVERTON/STONY STRATFORD DISTRICT

APPLICATIONS are invited from fully qualified gasfitters for the position of WORKING GASFITTING FOREMAN for the Wolverton/Stony Stratford district (Northampton Group). The appointment will be made initially within Intermediate Grade IV/V (salary range £500-£570) with Class 1 Conditions of Service.

The person appointed will assist with the improvement and consolidation of service to a reorganised district of some 7,600 consumers, and there will be scope in due course for his establishment as a supervisory foreman within the Staff grades.

The Gasfitting Foreman will reside at Stony Stratford, where a newly constructed flat will shortly be available under a standard Service Occupation Agreement. He will be required to undertake certain standby duties, on a rota basis, in connection with the grid reception/holder station, for which an appropriate payment will be made.

Applications stating age, qualifications, and experience, and giving the names of two referees should be addressed to reach Mr. E. B. Craddock, Group Manager, 45, Abington Street, Northampton, not later than Wednesday, August 22, 1956.

H. B. TAYLOR,
Divisional General Manager.

Leicester.
July 23, 1956.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
TECHNICAL ASSISTANT (PRODUCTION)
BOSTON GROUP

APPLICATIONS are invited from suitably qualified persons for the position of GROUP TECHNICAL ASSISTANT (PRODUCTION) at Boston at a commencing salary within Grades A.P.T. 5/6/7 (£575/£750 p.a.) according to age, qualifications and experience.

Applicants should preferably be in possession of the Institution of Gas Engineers' Higher Grade Certificate in Gas Manufacture or equivalent qualifications and they should have had experience of modern vertical retort installations.

The post is superannuable and the successful applicant will be required to pass a medical examination. He will also be required to join the Board's Staff Pension Scheme.

Applications giving details of education, training and experience together with the names and addresses of two referees should be addressed to reach the undersigned not later than August 11, 1956.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.
July 23, 1956.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION
ASSISTANT CHEMIST—COVENTRY DISTRICT

APPLICATIONS are invited from suitably qualified persons for the above position. The salary for the post will be in accordance with A.P.T. Grade 5 (£575-£655 per annum) of the National Salary Scales.

Applicants should have a sound knowledge of chemistry and gasworks processes and be experienced in the carrying out of gasworks tests.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications endorsed "Assistant Chemist" giving particulars of age, qualifications and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Gas Street, Coventry, to reach him not later than August 8, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON AND DISTRICT DIVISION
WORKS FOREMAN, SEDGLEY DISTRICT

APPLICATIONS are invited for the above appointment.

Candidates should have experience in the control of a small undertaking and some knowledge of the operation of Woodall-Duckham vertical retorts and gasworks ancillary plant and should preferably have had a mechanical training.

The salary for the post will be in accordance with Grade A.P.T. 6 (£610-£690 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. S. Jones, Divisional General Manager, West Midlands Gas Board, Kensington House, Bath Street, Dudley, to reach him not later than August 8, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DISTRICT SERVICE MANAGER, RUGELEY

THE successful applicant will be responsible for supervising the operation of the Sales and Service Department in a district with approximately 3,500 consumers.

The duties will also include responsibility for routine maintenance of the distribution system and local clerical records. Candidates should be experienced in the installation and maintenance of all types of gas appliances and the control of personnel and should possess a knowledge of mains and service laying, particularly emergency work.

The salary for the post will be in accordance with A.P.T. Grade 7 (£670 to £750 per annum) of the National Salary Scales for Gas Staffs. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than August 8, 1956.

J. C. INGRAM,
Secretary to the Board.

NORTH THAMES GAS BOARD

ASSISTANT ENGINEER (Mechanical) required at the Gasworks, Beckton, E.6, for supervising maintenance of heavy mechanical, steam and power plant. Higher National Certificate is the minimum qualification required.

Starting salary will be from £680 to £875 per annum according to age and experience. The successful candidate will be required to join the Staff Pension Scheme.

Applications, stating age and experience, to Staff Controller, 30, Kensington Church Street, W.8, quoting reference 666/345.

NORTHERN GAS BOARD

CUMBERLAND DIVISION
DOMESTIC AND INDUSTRIAL GAS SALES MANAGER

APPLICATIONS are invited from persons having the requisite experience to organise and develop gas sales for all purposes in the County of Cumberland. To meet the rapid expansion of industry in this area, sound practical and theoretical knowledge of the use of gas for industrial and commercial purposes is essential.

Salary ranging between £1,105-£1,265 per annum. The successful candidate will be required to pass a medical examination, and be subject to the provisions of the Board's Staff Pension Scheme.

The person appointed will be required to live in Carlisle and to take up his duties before October 1.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the undersigned not later than August 7, 1956.

A. R. CROFT,
Divisional General Manager.

50, Castle Street.
Carlisle.
July 19, 1956.

EASTERN GAS BOARD

IPSWICH DIVISION
MAINTENANCE FOREMAN, CHELMSFORD DISTRICT

APPLICATIONS are invited for the post of MAINTENANCE FOREMAN, who will be responsible for the supervision and control of all tradesmen (platers, fitters, blacksmiths, electricians, etc.) employed on a Works manufacturing 3 million cu.ft. gas per day.

Candidates should, preferably, have had experience in handling labour, and must have a sound practical knowledge of steam, petrol and diesel driven engines. Experience with mechanical transport will be considered an advantage.

The salary will be within the Grade A.P.T. 1 (Provincial 'A') £610-£690. A detached house near to the Works will be provided at a reasonable rent.

The successful candidate will be required to undergo a medical examination, and unless already subject to a Pension Scheme by virtue of the Gas (Pensions Rights) Regulations, 1950, will be required to join the Board's Staff Pension Scheme.

Applications, stating age, qualifications and experience, together with the names of two referees, to be addressed to the Group Manager, Eastern Gas Board, Chelmsford, to reach him by Saturday, August 4, 1956.

R. WHITING,
Divisional General Manager.

July 12, 1956.

PLANT FOR SALE

THE following semi-automatic Humphreys and Glasgow C.W.G. Plants together with ancillary equipment, are available for disposal. For further information, requests to view, and offers, please communicate with the undersigned.

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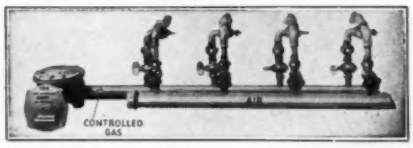

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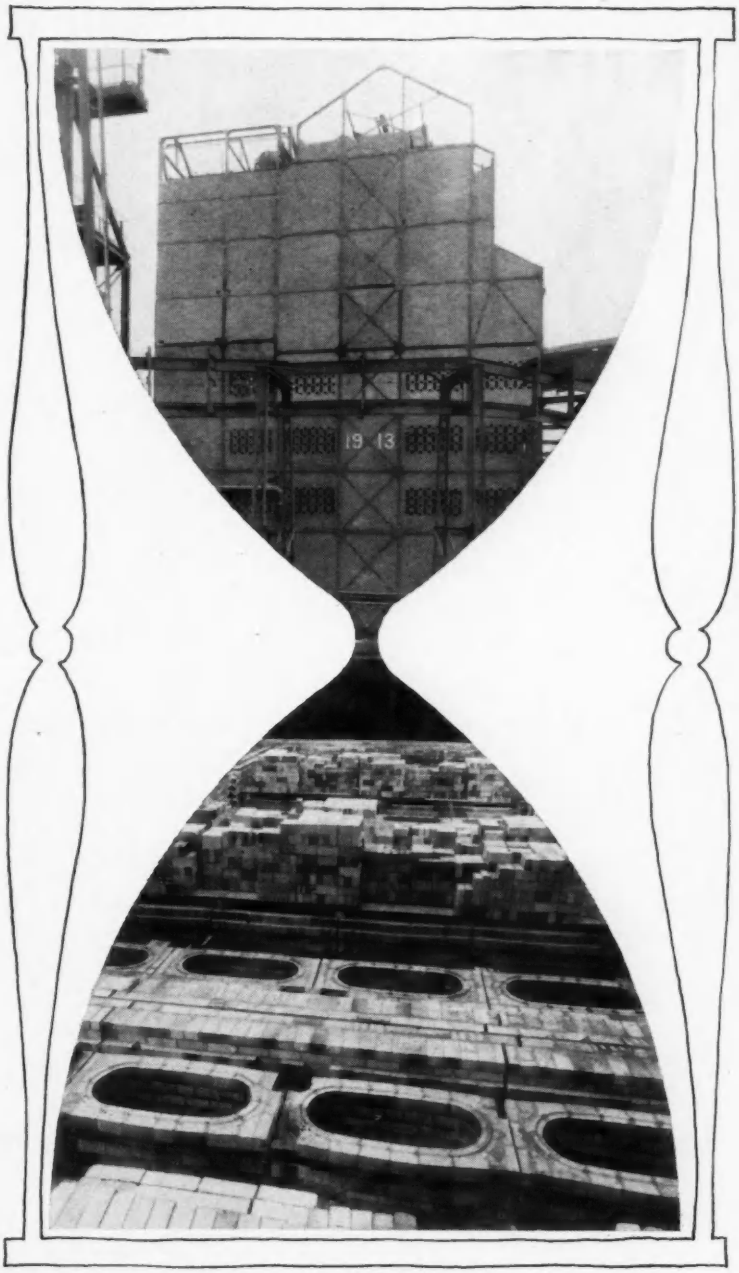
AFTER 43 YEARS . . .

The first installation of Glover-West continuous vertical retorts at Elswick, Newcastle, went into production in 1913 and proved even in those early days that the Glover-West system could handle high-swelling Durham gas-making coals successfully.

Part of that original plant, 40 retorts, is now under reconstruction for the second time, the work in progress being illustrated here. The complete installation at Elswick, including this portion, consists of 160 Glover-West continuous vertical retorts.

Photographs by courtesy of Northern Gas Board.



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W 1

Wonders of the World

The TAJ MAHAL

THE tomb of Mumtaz Mahal, wife of Shah Jahan. Standing at Agra, in India, it was completed in 1650 after 18 years of work. The white marble structure, 216 feet high and inlaid with precious stones forming phrases from the Koran, reputedly cost over £3,000,000. The name comes from one of the titles of Mumtaz Mahal, and means "Crown of the Palace."

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